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VOLUME XVI

CAMBRIDGE, MASSACHUSETTS, U. S. A.
PUBLISHED BY THE MUSEUM
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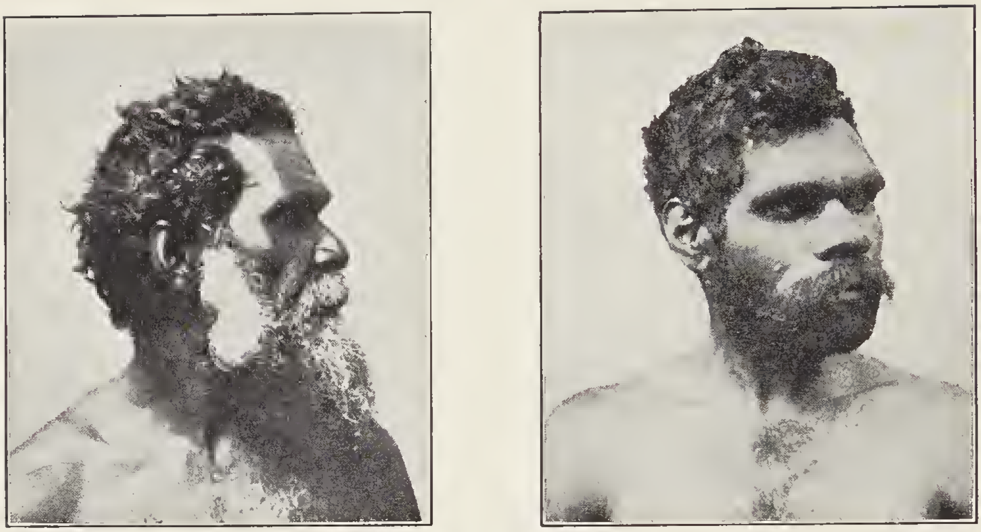
AUSTRALIAN TYPES



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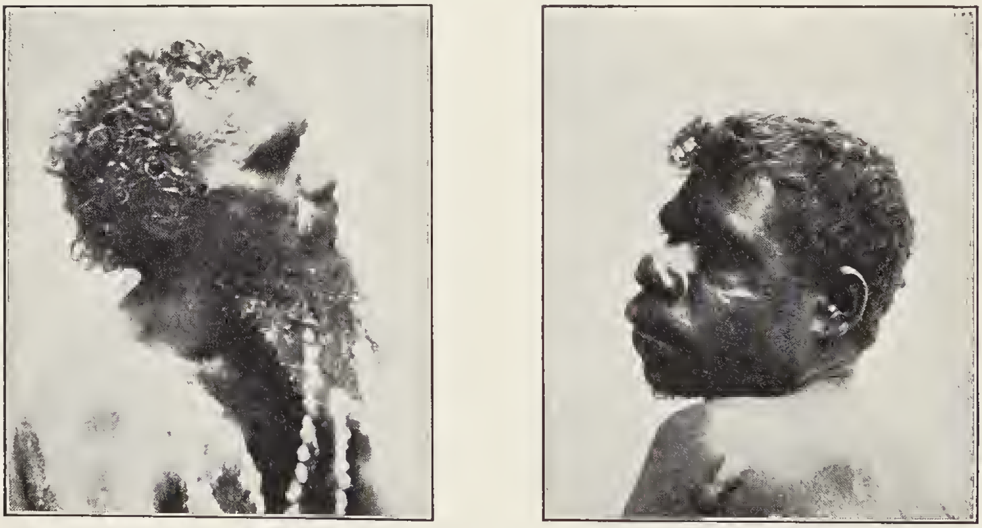

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PAPERS

OF THE

PEABODY MUSEUM OF AMERICAN ARCHAEOLOGY
AND ETHNOLOGY, HARVARD UNIVERSITY

VOL. XVI — NO. 1

ANTHROPOMETRY OF THE NATIVES OF ARNHEM LAND AND THE AUSTRALIAN RACE PROBLEM

ANALYSIS AND DISCUSSION BY

W. W. HOWELLS

DATA COLLECTED BY

W. L. WARNER

CAMBRIDGE, MASSACHUSETTS, U.S.A.
PUBLISHED BY THE MUSEUM
1937

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New York
1967

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Printed in U.S.A.

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INTRODUCTION

THE material upon which this study is based was collected by William Lloyd Warner in the course of an investigation of the social organization of the native inhabitants of northern Australia. The following presentation and discussion of the data was done by the undersigned, for which opportunity he wishes to express his profound gratitude to Mr. Warner. The latter describes his obtaining of the material as follows: "The field work for the several series of northern Australian aborigines described in this paper was done in 1927 at Port Darwin and on the Crocodile Islands near Cape Stewart in northeastern Arnhem Land. It was made possible by the generosity of the Rockefeller Foundation and the cooperation of the Australian government and the mission society located in the Crocodile Islands." The author also wishes to pay tribute to the kindness of Professor E. A. Hooton, who has read and criticized the manuscript and whose statistical staff in the Department of Anthropology of Harvard University accomplished the labor of the statistical analysis.

The scientific importance of the Australian aborigines is an anthropological axiom. That Warner's data comprise a valuable accretion to existing knowledge becomes obvious when it is realized how small is the amount of detailed investigation that has been carried out on the physical characteristics of the race. The series includes 239 adult males, mostly from northern Arnhem Land, and is divided into five subgroups, whose geographical distribution is defined in the succeeding section. There is also a smaller group of females which has not been subdivided geographically.

W. W. HOWELLS

GEOGRAPHICAL AREAS OF THE SUBGROUPS[1]

Northwest Arnhem Land. The people of northwestern Arnhem Land live on the coast of Timor Sea and inland along the tidal rivers from Daly River in the south to Cobourg Peninsula in the north. The heaviest concentration of individuals measured came from around the Daly River.

Victoria River. The peoples of this subgroup live in southwestern Arnhem Land, largely in the area drained by the Victoria River.

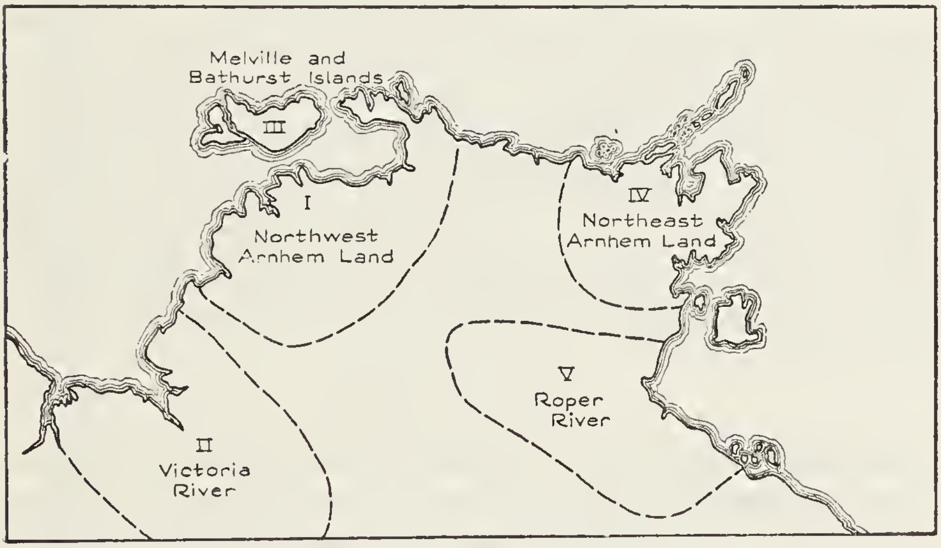

FIGURE 1. MAP OF GEOGRAPHICAL SUBGROUPS STUDIED

Melville and Bathurst Islands. Only the people living on Melville and Bathurst Islands compose this subgroup. They are two coastal islands on the western shore of Arnhem Land.

Northeast Arnhem Land. This area is bounded on the east by the Gulf of Carpentaria, on the north by the Sea of Arafura, on the west by a line running south from Cape Stewart, and on the south by a line running inland from the southern limits of Blue Mud Bay.

Roper River. The peoples included in the Roper group live in the general region of which the northern limits are formed roughly by the Rose River and a line drawn directly west from it; the eastern boundary consists of the Gulf of Carpentaria, from that river to the mouth of McArthur River. The southwestern boundaries are the headwaters of the coastal rivers found between the Roper and the McArthur. The western limits extend to the headwaters of the Roper.

---

[1] The distribution of tribes in northern Australia is given in an article by W. Lloyd Warner, 1933, pp. 63–86. The cultural subareas are also to be found in this account.

For the sake of brevity these groups will generally be designated throughout the paper by the first word in their titles as given above. The Northwest and Northeast groups are considerably larger than the others, the Roper group being so small as to be statistically unavailable. The numbers in each subgroup are: Northwest Arnhem Land, 99; Victoria River, 28; Melville and Bathurst Islands, 28; Northeast Arnhem Land, 77; Roper River, 8.

Besides a full schedule of measurements of each individual, there was recorded a number of detailed morphological observations, presented in the following tables of percentage distributions. Measurements and indices will not be considered abstractly, as the comparative treatment employed renders this superfluous, nor will much attention be given to the series taken as a whole, for reasons which will become apparent. The metrical treatment will consist of an investigation of the interrelations of the subgroups, of physical type in the continent as a whole, and lastly of relationships between the Australians and peoples outside of Australia.

OBSERVATIONS

Morphological observation is subject in a large degree to the personal equation of different workers. Therefore, since these records were not made by the preparator of the report, his comment upon them will be sternly restricted to the most essential points.

Pigmentation. No color standard was used in recording skin pigment, and therefore it cannot be said how light a "light brown" is meant. In the records made on Arunta and South Australians,[1] the lightest color is a "light chocolate," or, checked against Ridgway's standards, not lighter than a fairly rich medium brown. In general, the Australians have a reputation for very deep pigmentation. It is to be noticed that black hair is by no means universal in this region, and varying degrees of light hair have been reported as frequent from many parts of the continent. Why the Northeast people have such large proportions of the lighter shades of hair and skin is mysterious.

---

[1] Campbell and Hackett, 1927; Campbell and Lewis, 1926.

Table 1. SKIN COLOR

Male	Light Brown		Dark Brown		Total
	No.	Per cent	No.	Per cent	
Northwest	10	10.20	88	89.80	98
Victoria	9	32.14	19	67.86	28
Melville	1	3.57	27	96.43	28
Northeast	44	57.90	32	42.10	76
Roper	..	..	8	100.00	8
Total Male	64	26.89	174	73.11	238
Total Female	24	34.78	45	65.22	69

In every single case throughout the series of 224 males and 68 females, the color of the sclera was recorded as "bloodshot."

Hair. There is no woolly hair and a surprisingly high percentage of straight hair.

Nasal region. Here the tables seem to affirm the usual evidence regarding the primitive form of the Australian nose.

Cheek region. The degrees of fullness of the cheek indicate that the faces are mainly flat-sided.

Chin. This is shown to be clearly receding.

Ear. There is little of a remarkable nature in this organ. The lobe has a tendency to be small and to be attached along its inner margin, rather than pendant.

Teeth. An edge-to-edge bite is the predominating pattern. Loss of teeth, caries and wear have taken a very small toll, considering that the average age for the series is 35 years. In every case in which it was noted (about half the series), eruption of the teeth was complete.

Table 2. EYE COLOR

Male	Light Brown		Dark Brown		Black		Total
	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest	3	3.12	54	56.25	39	40.62	96
Victoria	2	7.69	14	53.85	10	38.46	26
Melville	..	..	20	100.00			20
Northeast	..	..	60	84.51	11	15.49	71
Roper	1	12.50	3	37.50	4	50.00	8
Total Male	6	2.71	151	68.32	64	28.96	221
Total Female	..	..	27	39.71	41	60.29	68

TABLE 3. HAIR COLOR

Male	Black		Dark Brown		Reddish Brown		Red		Gray, White		Total
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest	65	73.03	19	21.35	2	2.25	..	..	3	3.37	89
Victoria	21	75.00	6	21.43	..	..	..	..	1	3.57	28
Melville	24	92.31	2	7.69	..	..	..	..	..	..	26
Northeast	8	10.39	61	79.22	..	..	1	1.30	7	9.09	77
Roper	8	100.00	..	..	..	..	..	..	..	..	8
Total Male	126	55.26	88	38.60	2	.88	1	.44	11	4.82	228
Total Female	30	44.78	31	46.27	4	5.97	..	..	2	2.98	67

Table 4. HAIR FORM

Male	Straight		Low Waves		Deep Waves		Frizzly + Curly		
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	Total
Northwest ...	32	32.65	41	41.84	24	24.49	1	1.02	98
Victoria......	12	42.86	12	42.86	4	14.29	..	..	28
Melville......	4	14.29	12	42.86	10	35.71	2	7.14	28
Northeast....	5	6.49	63	81.82	9	11.69	..	..	77
Roper.......	..	..	5	62.50	3	37.50	..	..	8
Total Male...	53	22.18	133	55.65	50	20.92	3	1.26	239
Total Female	29	42.03	29	42.03	7	10.14	4	5.80	69

Comparative Data	Straight		Low Waves		Medium Waves		Deep Waves		Curly		Total
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	
Campbell	1	2.63	18	47.37	6	15.79	10	26.31	3	7.89	38

Table 5. NASAL PROFILE

Male	Concave		Straight		Convex		Concavo-convex		Total
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest ...	52	54.74	35	36.84	3	3.16	5	5.26	95
Victoria......	14	50.00	8	28.57	3	10.71	3	10.71	28
Melville......	14	51.85	13	48.15	..	..	..	..	27
Northeast....	16	21.33	32	42.67	18	24.00	9	12.00	75
Roper.......	3	37.50	5	62.50	..	..	..	..	8
Total Male...	99	42.49	93	39.91	24	7.30	17	10.30	233
Total Female	46	67.65	14	20.59	..	..	8	11.76	68

Table 6. NOSTRILS

Male	Antero-posterior		Oblique		Transverse		Total
	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest .	11	11.34	15	15.46	71	73.20	97
Victoria....	..	..	6	21.43	22	78.57	28
Melville....	2	8.00	1	4.00	22	88.00	25
Northeast .	11	14.67	6	8.00	58	77.33	75
Roper	2	25.00	..	..	6	75.00	8
Total Male	26	11.16	28	12.02	179	76.82	233
Total Female	4	5.80	13	18.84	52	75.36	69

Table 7. NASAL WINGS

Male	Medium		Flaring		Total
	No.	Per cent	No.	Per cent	
Northwest	29	30.85	65	69.15	94
Victoria	7	25.93	20	74.07	27
Melville	12	46.15	14	53.85	26
Northeast	35	46.67	40	53.33	75
Roper	3	37.50	5	62.50	8
Total Male	86	37.39	144	62.61	230
Total Female	41	60.29	27	39.71	68

Table 8. NASAL SEPTUM

Male	Straight		Concave		Convex		
	No.	Per cent	No.	Per cent	No.	Per cent	Total
Northwest	2	2.35	2	2.35	81	95.29	85
Victoria	4	14.29	..	..	24	85.71	28
Melville	..	..	..	..	18	100.00	18
Northeast	1	1.33	..	..	74	98.67	75
Roper	..	..	..	..	6	100.00	6
Total Male	7	3.30	2	.94	203	95.75	212
Total Female	2	2.98	..	..	65	97.01	67

Table 9. NASAL SEPTUM INCLINATION

Male	Up		Down		Total
	No.	Per cent	No.	Per cent	
Northwest	85	97.70	2	2.30	87
Victoria	25	96.15	1	3.85	26
Melville	23	100.00	..	..	23
Northeast	75	100.00	..	..	75
Roper	6	100.00	..	..	6
Total Male	214	98.62	3	1.38	217
Total Female	63	98.44	1	1.56	64

Table 10. CHEEKS FULLNESS

Male	Submedium		Medium		Pronounced		Total
	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest	82	87.23	12	12.77	..	..	94
Victoria	25	92.59	2	7.41	..	..	27
Melville	25	96.15	1	3.85	..	..	26
Northeast	63	84.00	12	16.00	..	..	75
Roper	6	75.00	2	25.00	..	..	8
Total Male	201	87.39	29	12.61	..	..	230
Total Female	44	64.71	23	33.82	1	1.47	68

Table 11. CHEEKS WRINKLING

Male	Absent		Slight, Medium		Pronounced		Total
	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest	48	52.17	41	44.57	3	3.26	92
Victoria	12	42.86	16	57.14	..	..	28
Melville	14	56.00	11	44.00	..	..	25
Northeast	35	46.05	41	53.95	..	..	76
Roper	3	37.50	5	62.50	..	..	8
Total Male	112	48.91	114	49.78	3	1.31	229
Total Female	44	66.67	22	33.33	..	..	66

Table 12. CHIN PROMINENCE

Male	Absent		Submedium		Medium		Total
	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest	4	4.12	85	87.63	8	8.25	97
Victoria	..	..	24	85.71	4	14.29	28
Melville	..	..	23	82.14	5	17.86	28
Northeast	3	3.90	50	64.94	24	31.17	77
Roper	..	..	8	100.00	..	..	8
Total Male	7	2.94	190	79.83	41	17.23	238
Total Female	..	..	61	88.41	8	11.59	69

Table 13. EAR LOBES

Male	Submedium		Medium		Pronounced		Total
	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest	28	69.79	67	29.17	1	1.04	96
Victoria	7	25.00	21	75.00	..	..	28
Melville	6	21.43	22	78.57	..	..	28
Northeast	31	40.26	45	58.44	1	1.30	77
Roper	..	..	8	100.00	..	..	8
Total Male	72	30.38	163	68.78	2	.84	237
Total Female	23	33.33	46	66.67	..	..	69

Table 14. EAR LOBE ATTACHMENT

Male	Attached		Free		Total
	No.	Per cent	No.	Per cent	
Northwest	44	44.90	54	55.10	98
Victoria	7	25.93	20	74.07	27
Melville	13	46.43	15	53.57	28
Northeast	45	58.44	32	41.56	77
Roper	3	37.50	5	62.50	8
Total Male	112	47.06	126	52.94	238
Total Female	36	52.17	33	47.83	69

Table 15. BITE

Male	Under		Edge-to-Edge		Slight Over		Marked Over		Total
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest	5	6.49	58	75.32	11	14.29	3	3.90	77
Victoria	1	5.26	15	78.95	2	10.53	1	5.26	19
Melville	2	7.69	17	65.38	2	7.69	5	19.23	26
Northeast	3	3.90	60	77.92	10	12.99	4	5.19	77
Roper	..	..	5	83.33	1	16.67	..	..	6
Total Male	11	5.37	155	75.61	26	12.68	13	6.34	205
Total Female	..	..	39	70.91	11	20.00	5	9.09	55

TABLE 16. TEETH LOST

Male	None		Few		Many		Total
	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest .	38	59.38	21	32.81	5	7.81	64
Victoria	15	71.43	4	19.05	2	9.52	21
Melville	20	90.91	2	9.09	. .	. .	22
Northeast .	51	69.86	19	26.03	3	4.11	73
Roper	1	25.00	2	50.00	1	25.00	4
Total Male	125	67.93	48	26.09	11	5.98	184
Total Female	37	71.15	11	21.15	4	7.69	52

TABLE 17. TEETH CARIES

Male	None		Few		Many		Total
	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest .	44	61.97	9	12.68	18	25.35	71
Victoria	14	73.68	1	5.26	4	21.05	19
Melville	23	92.00	2	8.00	. .	. .	25
Northeast .	56	73.68	13	17.10	7	9.21	76
Roper	2	50.00	2	50.00	. .	. .	4
Total Male	139	71.28	27	13.85	29	14.87	195
Total Female	43	79.63	6	11.11	5	9.26	54

TABLE 18. TEETH WEAR

Male	None		Slight, Medium		Pronounced		Total
	No.	Per cent	No.	Per cent	No.	Per cent	
Northwest . .	35	47.30	34	45.95	5	6.76	74
Victoria	15	71.43	5	23.81	1	4.76	21
Melville	19	82.61	4	17.39	. .	. .	23
Northeast . .	36	48.00	36	48.00	3	4.00	75
Roper	1	25.00	3	75.00	. .	. .	4
Total Male .	106	53.81	82	41.62	9	4.57	197
Total Female	34	57.63	20	33.90	5	8.47	59

COMPARISON OF GEOGRAPHICAL SUBGROUPS

Statistical Validity of Differences. In comparing the subgroups with one another, the necessary first step is to find out whether such differences as obtain are significant in a statistical sense, or are merely the product of sampling. In general, any given metrical difference between two groups is considered significant if it is three times the size of its own probable error,[1] since the chances of such an occurrence in random samples of the same population are approximately one in twenty-five. The expectation of a difference

---

[1] $PE\ (M_1 - M_2) = \sqrt{(PEM_1)^2 + (PEM_2)^2}$.

Table 19. DIFFERENCES OF MEANS OF GEOGRAPHICAL SUBGROUPS WITH VALUE IN TERMS OF PROBABLE ERROR

	Northwest-Victoria		Northwest-Northeast		Northwest-Melville		Victoria-Northeast		Victoria-Melville		Melville-Northeast	
	Diff.	x p.e.	Diff.	x p.e.	Diff.	x p.e.	Diff.	x p.e.	Diff.	x p.e.	Diff.	x p.e.
Height	.33	0.38	2.64	4.47	2.79	3.99	2.31	2.60	2.46	2.54	.15	0.21
Weight	4.50	1.93	1.60	0.54	4.10	1.93	2.90	0.83	.40	0.14	2.50	0.74
Biacromial diameter	.82	2.48	.50	2.38	1.48	5.10	1.32	4.13	.66	1.74	1.98	7.33
Sitting height	.10	0.20	.01	0.03	1.06	2.41	.09	0.17	.96	1.60	1.05	2.33
Chest depth	1.36	5.23	.24	1.71	.44	2.44	1.12	4.67	.92	3.41	.20	1.25
Chest breadth	.99	3.30	1.05	5.25	.45	1.88	.06	.21	1.44	4.65	1.50	6.82
Total head length	3.76	2.96	5.88	7.17	5.04	4.71	2.12	1.63	1.28	.87	.84	.76
Hand length	1.68	2.27	3.96	7.62	1.68	2.71	2.28	3.08	.00	.00	2.28	3.68
Hand breadth	1.44	1.95	2.58	5.73	1.44	2.29	1.14	1.52	.00	.00	1.14	1.78
Head length	.18	.19	1.17	1.80	3.93	3.97	1.35	1.57	4.11	3.57	2.76	3.00
Head breadth	.87	1.21	3.99	5.05	2.01	3.14	4.86	5.12	2.88	3.47	1.98	2.22
Head height	.24	.27	6.06	10.63	.36	.58	5.82	6.54	.12	.13	5.70	8.77
Head circumference	6.60	3.24	1.80	1.12	8.76	3.52	8.40	4.18	2.16	.78	10.76	4.29
Minimum frontal diameter	.28	.35	.16	.33	.44	.59	.12	.15	.72	.75	.60	.81
Bizygomatic diameter	1.85	2.68	.50	.96	2.95	3.88	1.35	1.85	4.80	5.22	3.45	4.31
Bigonial diameter	3.60	3.67	1.80	3.16	1.08	1.30	1.80	1.82	4.68	4.03	2.88	3.43
Total face height	.60	.63	3.25	4.85	2.85	2.79	3.85	4.14	3.40	2.81	.40	.40
Upper face height	.90	1.29	2.45	4.90	3.15	4.77	3.35	4.72	4.05	4.88	.70	1.04
Nose height	.32	.46	2.00	4.76	3.20	5.52	1.68	2.51	2.88	3.69	1.20	2.18
Nose breadth	.24	.39	.60	1.62	.45	.82	.36	.58	.21	.28	.15	.27
Ear length	1.16	1.63	.92	2.04	1.56	2.33	.24	.35	.40	.47	.64	.98
Ear breadth	.48	1.17	.18	.69	.15	.44	.30	.71	.33	.70	.03	.09
Relative shoulder breadth	.04	.19	.56	5.09	.82	7.45	.52	2.60	.86	4.30	1.38	15.33
Relative sitting height	.32	1.33	.32	1.78	.68	2.96	.64	2.56	1.00	3.45	.36	1.50
Hand index	.30	.79	.26	1.24	.52	2.26	.56	1.47	.22	.56	.78	3.55
Cephalic index	.54	1.06	2.61	8.70	2.46	6.83	3.15	6.06	3.00	5.36	.15	.41
Length-height index	.06	.11	3.78	11.12	1.77	4.54	3.84	6.98	1.83	3.16	2.01	5.03
Breadth-height index	.33	.48	1.47	3.34	1.56	3.12	1.14	1.73	1.89	2.70	3.03	6.59
Fronto-parietal index	.96	2.23	1.50	3.57	1.59	3.61	2.46	4.92	2.55	4.90	.09	.18
Cephalo-facial index	2.04	3.29	2.88	7.02	3.39	4.71	4.92	7.45	5.43	6.17	.51	.68
Zygo-frontal index	.20	.34	.20	.67	1.08	2.35	.00	.00	1.28	1.94	1.28	2.84
Fronto-gonial index	3.85	4.43	1.85	2.85	.10	.12	2.00	2.25	3.95	3.99	1.95	2.41
Zygo-gonial index	1.74	3.35	1.11	2.71	.00	.00	.63	1.15	1.74	2.90	1.11	2.22
Facial index	1.32	1.88	1.50	3.06	3.32	4.81	2.82	3.97	4.64	5.40	1.82	2.60
Upper facial index	1.95	3.42	1.74	4.46	2.58	6.14	3.69	6.47	4.53	7.68	.84	2.05
Nasal index	.48	.39	5.84	5.73	5.52	3.52	2.46	4.92	2.55	4.90	.09	.18
Ear index	.44	.49	.48	1.07	1.44	1.82	.04	.04	1.00	.90	.96	1.23

four times its probable error is only seven in a thousand comparisons.

In Table 19 are given all the intergroup differences in measurements and indices, each difference being accompanied, not by its probable error, but by the quotient of itself divided by its probable error. (The Roper River group is omitted, being too small for statistical manipulation.) Thus, it is to be seen that the difference between the Northwest and Northeast groups in the cephalic index is 2.61 units, which is 8.7 times its probable error. In spite of the small size of the difference, the chances are over a hundred million to one that it is due to some factor other than random sampling.

An examination of Table 20 shows, in the first place, that it would be difficult to say whether the Northwest and Victoria groups are separable on this basis from each other. In a few random measurements the differences are statistically significant, as in several facial indices, which, it should be noted, are more or less related to one another (cephalo-facial, fronto-gonial, zygo-gonial and upper facial). Otherwise the majority of differences are such as the process of sampling might induce. Both the Northwest and Victoria groups, however, differ significantly from the Melville and Northeast groups in so many measurements and indices that such an explanation is out of the question. The Melville and Northeast groups likewise differ in a large number of measurements, though in only a few indices. The total difference may perhaps be considered to be smaller in this case, since it will be seen that it is partly induced by correlation; the Melville people are larger than the Northeast group in many of their measurements, which is a single general character.

In Table 20, the differences in terms of the probable error have been tabulated in simple form according to size. These distributions are of no definite significance by themselves, but merely summarize Table 19. The figures listed opposite "probability" are the distribution expected to arise from an equal number of samplings in a single character, and not, as in this case, in different characters.

The indices, perhaps due to their smaller variability, exhibit in almost all cases more significant differences than the measurements. The only individual characters which do not seem to differ significantly among the groups are weight, sitting height, minimum frontal breadth, nasal breadth, the length, breadth, and index of the ear, and perhaps the zygo-frontal index. It may be that some of these are characters of little use in racial diagnosis, or that they exhibit, in themselves, too little or too great variability to show clear differences between such closely related groups.

Table 20. TABULATION BY SIZE OF INTERGROUP DIFFERENCES IN TERMS OF THEIR PROBABLE ERRORS

	0–1	1–2	2–3	3–4	4–x	Mean
22 measurements						
Probability	11	7.10	2.95	0.79	0.15	1.23
Northwest-Victoria	8	6	4	3	1	1.72
Northwest-Northeast	5	4	2	1	10	3.49
Northwest-Melville	4	3	6	5	4	2.78
Victoria-Northeast	6	6	2	1	7	2.41
Victoria-Melville	10	2	2	4	4	2.08
Melville-Northeast	8	3	4	2	5	2.58
15 indices						
Probability	7.50	4.84	2.01	0.54	0.10	1.23
Northwest-Victoria	7	3	1	3	1	1.59
Northwest-Northeast	1	3	2	3	6	4.16
Northwest-Melville	2	1	3	3	6	3.62
Victoria-Northeast	2	3	3	1	6	3.45
Victoria-Melville	2	1	3	3	6	3.75
Melville-Northeast	4	2	5	1	3	3.12

Table 21. MEAN DIFFERENCES BETWEEN GEOGRAPHICAL SUBGROUPS

	22 measurements	15 indices	10 head measurements	11 head indices
Northwest-Victoria	1.47	.97	.91	1.22
Northwest-Northeast	1.97	1.74	2.20	2.23
Northwest-Melville	2.24	1.79	2.04	2.12
Northwest-Roper	2.32	2.02	2.14	2.64
Victoria-Northeast	2.13	2.12	2.45	2.73
Victoria-Melville	1.77	2.60	2.78	3.26
Victoria-Roper	2.35	2.14	2.88	2.81
Northeast-Melville	1.94	1.11	1.88	1.19
Northeast-Roper	3.16	1.53	3.28	1.96
Melville-Roper	1.58	1.52	1.48	1.88

Mean Differences of Subgroups. The probable error furnishes us with the statistical, but not the absolute, difference between subgroups; to approximate the latter we calculate the mean differences, given in Table 21, for each pair of groups. This is supplied for the measurements and indices of the head, as well as for all the characters together. Fortunately the Roper River group may be included in this type of treatment.

The likeness between the Northwest and Victoria groups is reaffirmed; they exhibit a strong affinity for each other, as opposed to the remaining divisions. These latter also form a group within which the mean differences, with one exception, are low, particularly in indices, so that the major fact of importance remains the separation of these three groups from the first two. If, in the head measurements, head height and bigonial width were omitted, the lines would be more strictly drawn, as each of these characters is inexplicably aberrant in one group. Likewise, if only five indices are employed, the cephalic, cephalo-facial, facial, upper facial and nasal, these mean differences are obtained:

Northwest-Victoria	Northwest-Northeast	Northwest-Melville	Northwest-Roper	Victoria-Northeast	Victoria-Melville	Victoria-Roper	Northeast-Melville	Northeast-Roper	Melville-Roper
1.27	2.91	3.45	2.87	3.99	4.53	3.94	.73	1.56	1.57

The comparative lowness of the first figure and of the last three again emphasizes the same line of cleavage. The placing of the remaining groups is not so simple. The principal common characteristic of the Melville, the Northeast, and the Roper groups is their unlikeness to the other two. Beyond this, the impression is that in a general way the Melville and Bathurst group stands between the Northeast and Roper people, with affinities in both directions. All three of these are about equally near to the Northwest group and equally remote from the Victoria group. The affinities and disparities of each of the divisions may be summed up in the following manner. From the Victoria River sample, the Northwest group is hardly significantly different, though all the others are far removed. The Northwest group is closest to the Victoria group and only moderately distant from the other three. Melville and Bathurst Islands are most nearly approached by Roper and Northeast, less nearly by the Northwest sample and not at all by that from the Victoria River. Both the Roper and Northeast groups have these affinities in common: nearest, Melville and Bathurst; next, Northwest; furthest, Victoria River; furthermore, though they differ strongly from each other in the measurements, their mutual difference is only moderate in the indices.

Comparison of Measurements and Indices of the Subgroups. Going into particulars, let us inspect the actual means of the subgroups, to find out in what bodily characteristics the above relationships are borne out.

In stature, shoulder breadth and relative shoulder breadth, sitting height and relative sitting height, there is a contrast between Melville and Bathurst Islands on one hand and the Northwest and Victoria groups on the other. The latter are two or three centimeters taller than all the other groups, though the Melville group is the greatest in shoulder breadth and trunk length. Thus, Melville and Bathurst have the greatest relative shoulder breadth, Northeast Arnhem Land having the least; and the greatest relative sitting height, the Northwest and Victoria having the least.

Head length is in inverse ratio to head breadth, the Northwest-Victoria people having indices of about 73, the others, 70. There is little variety in head height, except for the very low-headed Northeast group. The length-height and breadth-height indices are therefore controlled by the length and breadth, except in the case of the Northeast group. This group has the smallest heads, these being lowest, narrowest, and comparatively short.

Differences in the forehead breadth are trivial, except for the Roper group, which is much higher than the others. The fronto-parietal indices are thus mere reflections of the head-breadths.

Victoria, Northwest and Northeast are the groups with the narrowest faces; since the first two have also the broadest heads, their cephalo-facial index is the lowest. The zygo-frontal index illustrates only the fact that the Roper group has the broadest foreheads, and Melville and Bathurst the broadest faces.

The face and the upper face are longest for the Northwest-Victoria groups and Roper River, and shortest for Melville and Bathurst and the Northeast groups. Since the face width takes the opposite trend, the differences are exaggerated in the face indices.

The Northwest-Victoria groups have the longest and narrowest noses (if any difference can be said to exist in nose breadth).

In the mandibular breadth the Northwest and Victoria groups separate, the former being higher, exceeding the Northeast group, and approaching the still higher Roper and Melville and Bathurst divisions. A similar situation exists in the fronto-gonial index, though the wide forehead of the Roper group, in spite of the wide jaw, lowers the index to the level of the Victoria River group. Little can be said of the zygo-gonial index, though the Northwest-Victoria groups are still parted, the latter being the highest, together with Melville and Bathurst Islands.

The differences in the ear measurements are so small as to be unworthy of comment. In hand size, the order is the same for length and breadth, Northeast smallest and Northwest and Roper largest. The head circumference of the Northwest and Northeast groups is distinctly below that of the others.

The facts are best summed up by describing each group in terms of the composite of all of them, and generally disregarding such differences as are statistically significant but diagnostically unimportant.

The Northwest and Victoria River samples may be considered together. The people of this group are taller, with relatively longer legs, than the rest. Though the head is approximately the same size, it is distinctly less dolichocephalic, and the length-height index is the highest, due to the lesser length. The face is narrower, particularly in relation to the broad head, and it is long, both absolutely and in the facial index. The noses are longer, and thus somewhat less platyrrhine. In the bigonial breadth, there is a division, the Victoria River group having the narrowest jaws of all, although the Northwest mean is not as high as that of the Melville and Roper groups.

It is understood that the Melville and Bathurst, Roper, and Northeast groups share generally the opposite form of a character to that by which the Northwest and Victoria groups are distinguished from them; none of them is consistently further away or nearer the two latter than are the others.

The Melville and Bathurst sample has as its particular body features the greatest shoulder breadth and trunk length, without the greatest stature. With the Roper group it shares the longest heads and widest faces, and with the Northeast group the shortest faces; therefore the facial index is the most euryprosopic of all. Also with the Northeast group, the nose is most platyrrhine and the lower jaw is relatively and absolutely wide.

The Northeast division has in most cases the smallest absolute measurements, and this furnishes its contrast with the Roper group which in a general way has the largest; this contrast is not found in the indices. In other words there is a demarcation between the two in size but not necessarily in form. It should be remembered again that the Roper group is very small, and one large individual might be responsible for all these effects. The Roper group has the long-

TABLE 22. COMPARISON OF MEANS OF SUBGROUPS AND TOTAL

	Northwest	Victoria	Melville	Northeast	Roper	Total
Height	169.62± .40	169.29± .78	166.83± .58	166.98± .43	166.50	168.30±.26
Weight	121.40±1.02	125.90±2.09	125.50±1.86	123.00±2.80	130.50	123.30±.58
Biacromial diameter	35.14± .16	35.96± .29	36.62± .24	34.64± .13	36.50	35.60±.09
Sitting height	82.02± .22	82.12± .46	83.08± .38	82.03± .24	82.00	82.57±.14
Chest depth	19.08± .12	17.72± .23	18.64± .14	18.84± .08	19.00	18.80±.07
Chest breadth	24.45± .16	23.46± .25	24.90± .18	23.40± .12	24.36	24.06±.09
Total hand length	188.70± .56	184.94±1.15	183.66± .92	182.82± .61	186.62	185.82±.37
Hand length	106.56± .37	104.88± .64	104.88± .50	102.60± .37	106.86	104.91±.23
Hand breadth	82.48± .31	81.04± .67	81.04± .55	79.90± .33	83.86	81.37±.20
Head length	188.97± .53	188.79± .75	192.90± .84	190.14± .37	193.86	189.93±.27
Head breadth	138.01± .35	138.88± .63	136.00± .54	134.02± .71	137.14	136.54±.23
Head height	126.36± .38	126.12± .79	126.00± .49	120.30± .42	127.71	124.29±.27
Head circumference	530.90±1.17	537.50±1.67	539.66±2.20	529.10±1.11	542.06	532.46±.71
Minimum frontal diameter	104.78± .35	104.50± .71	105.22± .65	104.62± .35	108.78	104.82±.22
Bizygomatic diameter	139.75± .33	137.90± .61	142.70± .69	139.25± .40	143.25	139.85±.23
Bigonial diameter	105.26± .40	101.66± .90	106.34± .73	103.46± .41	107.50	104.46±.25
Total face height	113.05± .49	113.65± .81	110.20± .90	109.80± .45	113.25	111.70±.30
Upper face height	64.60± .34	65.50± .61	61.45± .57	62.15± .36	63.90	63.50±.22
Nose height	48.54± .32	48.22± .61	45.34± .48	46.54± .27	45.50	47.38±.19
Nose breadth	46.88± .26	47.12± .56	47.33± .48	47.48± .26	47.36	47.15±.16
Ear length	64.22± .34	63.06± .62	62.66± .58	63.30± .29	64.50	63.62±.20
Ear breadth	35.94± .18	35.46± .37	35.79± .29	35.76± .19	35.25	35.76±.11
Relative shoulder breadth	21.26± .09	21.22± .19	22.08± .07	20.70± .06	21.50	21.18±.05
Relative sitting height	48.96± .12	48.64± .21	49.64± .20	49.28± .13	49.36	49.12±.07
Hand index	43.84± .16	44.14± .35	44.36± .17	43.58± .14	44.00	43.86±.09
Cephalic index	72.96± .20	73.50± .47	70.50± .30	70.35± .22	70.14	71.82±.14
Length-height index	67.01± .23	67.07± .49	65.24± .31	63.23± .25	66.29	65.51±.16
Breadth-height index	91.25± .34	90.92± .60	92.81± .37	89.78± .28	93.29	90.95±.20
Fronto-parietal index	75.97± .24	75.01± .36	77.56± .37	77.47± .34	78.58	76.63±.17
Cephalo-facial index	95.15± .25	93.11± .57	98.54± .67	98.03± .33	100.64	96.44±.21
Zygo-frontal index	75.02± .23	75.22± .53	73.94± .40	75.22± .20	79.22	75.02±.15
Fronto-gonial index	100.85± .44	97.00± .75	100.95± .65	99.00± .48	97.00	99.80±.28
Zygo-gonial index	75.37± .27	73.63± .45	75.37± .39	74.26± .31	74.14	74.77±.17
Facial index	80.98± .35	82.30± .61	77.66± .60	79.48± .36	78.50	80.14±.22
Upper facial index	46.37± .28	48.32± .50	43.79± .31	44.63± .27	46.25	45.71±.17
Nasal index	98.06± .66	98.54±1.03	103.58±1.43	103.90± .78	101.50	100.74±.45
Ear index	56.06± .33	56.50± .84	57.50± .72	56.54± .31	56.50	56.46±.21

est heads, while the Northeast group has the narrowest and almost the shortest; the index of both is 70. The Northeast group has the lowest, the Roper the highest heads. The foreheads, zygomatic arches, and mandibles of the Northeast sample are among the narrowest while those of the Roper group are the broadest. In the cephalic and facial indices they are almost the same; in most of the other indices the Northeast group approaches the general average, while the Roper group tends to be extreme; it is the Northeast group, however, which has the most platyrrhine noses of all.

Comparison of Observations in the Subgroups. The nonmetrical characters furnish some differences between the groups, although they cannot be relied on as fully as the means of the measurements, which have the virtue of being single figures, statistically controlled, instead of a table of percentages. Moreover, the Roper River group, being so small, must be disregarded as far as percentage distributions go.

The Northwest group is, along with the Victoria River group, possessed of the greatest amount of straight hair. In hair color, the Northeast sample is distinct, being mainly dark brown, while the others are almost entirely black; the same is true for skin color, while both Northeast and Melville and Bathurst Islands have lighter eyes.

In the Northeast group we find the most convex noses, while the most flaring wings are those of the Victoria and Northwest people.

Physical Type of Subgroups. The Northwest and Victoria groups are, metrically, taller and longer-legged, less dolichocephalic though with relatively longer faces and noses. Their noses are at the same time more flaring. Their hair is more often straight.

The Melville and Bathurst people have the largest trunks, are very dolichocephalic, euryprosopic, and platyrrhine. They also have the lightest eyes.

The Northeast group seems somewhat stunted when compared to the others, particularly in head measures. It, too, is very dolichocephalic and platyrrhine, though the facial index is medium for Australians. The group has also relatively light eyes, and the most projecting noses and chins.

The Roper group is distinguished by large heads and faces. The head is long and absolutely dolichocephalic and the face, at the forehead, the zygomata and the gonial angles, is absolutely and rela-

TABLE 23. COMPARISON OF TOTAL SERIES WITH OTHER AUSTRALIAN GROUPS

	North Australia		Central Australia
	Warner	Burston	Campbell and Hackett
Number	239	62	42
Head length	189.93	192.69	192.48
Head breadth	136.54	140.20	143.20
Head height	124.29	135.42 (?)	127.29
Minimum frontal diameter	104.82	112.30 (?)	102.50
Bizygomatic diameter	139.85	139.35	141.05
Bigonial diameter	104.46	105.70	102.38
Total face height	111.70	117.00	114.55
Upper face height	63.50	66.20	..
Nose height	47.38	48.86	53.14
Nose breadth	47.15	46.28	50.06
Cephalic index	71.82	72.81	74.28
Length-height index	65.51	69.98 (?)	66.14
Breadth-height index	90.95	96.32 (?)	89.00
Fronto-parietal index	76.63	80.11 (?)	71.50
Cephalo-facial index	96.44	93.44	92.51
Zygo-frontal index	75.02	80.66 (?)	72.74
Fronto-gonial index	99.80	94.25 (?)	99.55
Zygo-gonial index	74.77	75.58	72.43
Facial index	80.14	84.06	81.26
Upper facial index	45.71	47.72	..
Nasal index	100.74	95.82	94.82

TABLE 24. MEAN DIFFERENCES OF GEOGRAPHICAL SUB-GROUPS FROM COMPARATIVE SERIES

	Central Australia — Campbell and Hackett	
	9 Head Measurements [1]	10 Head Indices [2]
Total	3.26	2.60
Northwest	2.82	2.16
Victoria	2.65	1.87
Melville	3.57	3.85
Northeast	4.16	3.48
Roper	3.68	4.40

	North Australia — Burston	
	8 Head Measurements [3]	6 Head Indices [4]
Total	2.31	2.61
Northwest	1.65	1.46
Victoria	2.03	1.34
Melville	3.06	4.28
Northeast	3.23	4.02
Roper	2.56	4.00

Total	Warner-Burston	Warner-Campbell	Burston-Campbell
7 Measurements [5]	2.26	3.43	2.68
5 Indices [6]	2.73	3.15	1.87

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[1] Does not include upper face height.
[2] Does not include upper facial index.
[3] Does not include minimum frontal or head height.
[4] Does not include indices involving head height or minimum frontal.
[5] Head length and breadth, face height, bizygomatic, nose height and breadth, bigonial.
[6] Cephalic, cephalo-facial, facial, nasal, zygo-gonial.

tively broad; it is also comparatively long, though the index is medium, as is the nasal index.

Summary. It seems possible to form two groups, divided by a line running northwest and southeast; the northern division comprising the people of the Melville, Northeast and Roper groups, the southern group containing the Northwest and Victoria people. The latter are taller than those of the first group, with shorter and wider heads and a distinctly higher cephalic index. The face in this portion is both narrower and longer, and the nose is longer and narrower, producing in both of the derived indices a definite difference. The Northwest people appear nearer than those of Victoria River to the groups of the northern division physically as well as geographically.

COMPARISON WITH OTHER AUSTRALIAN GROUPS

For detailed comparative purposes there are only two other series of adequate size. One, published by R. Burston, is drawn from North Australia and coincides geographically with Warner's in a general way. It is unknown which areas are best represented, but the following note, in a personal communication from Warner, is edifying: "According to reliable information, Burston measured his material in the town of Port Darwin. It is highly likely that most of his natives came from western Arnhem Land, and it is certain that few if any came from northeastern Arnhem Land, and very few from the Roper River region." In these circumstances one would expect this series to exhibit a resemblance particularly to the subgroup of Warner's series from Northwest Arnhem Land. The other sample, obtained by Campbell and Hackett, is from Central Australia and northern South Australia, and is almost entirely of the Arunta tribe.[1]

We may compare these two groups with the present material by finding their mean differences in selected characters. Certain measurements, such as those taken by Burston on the forehead and the head height, were obviously not made according to standard technique and must be discarded, along with the indices derived from them. Other discrepancies may be due in part to a personal equation among the three observers, but in the calculations of the mean differences these should to a large extent cancel each other.

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[1] The means for these two series were calculated from the published material by the statistical staff of the Division of Anthropology.

Since these two series obviously differ in many ways from Warner's total series, the question arises whether such differences are due in part to a likeness to any of the subgroups: that is, whether they resemble any of the subgroups more than the total group and more than the other subgroups.

For both the Central Australian and the Burston series the average differences of certain means from those of each of the subgroups, as well as the total group, have been calculated. This process was carried out only on the measurements and indices of the head, as it would be inadvisable to include less significant or highly variable characters such as weight, etcetera. Furthermore, the figures applying to the Burston series are not comparable with those for the Campbell series, since each furnishes some measurements not present in the other.

There are also given the mutual average differences between all three major series for head measurements and indices common to all. These indicate that the present series is more closely resembled by that of Burston than by Campbell's.

In the preceding section, it was found that a demarcation among Warner's series existed between the Northwest and Victoria groups on one hand and the Melville, Northeast, and Roper groups on the other. The figures indicate that both comparative series here dealt with resemble the Northwest and Victoria groups far more closely than the others; there is a gratifying unanimity in this direction. Neither the Northwest nor Victoria River groups seem favored in this respect, however. Also, the differences are less for the indices than for the measurements, which is not true in the case of the other three groups, and which seems to indicate that the general form of the head and its features definitely exhibits a likeness between the Northwest-Victoria group and the two comparative series. The mean difference of our total series from the latter two is intermediate, which confirms the above findings.

Going into particulars, we find that both the Campbell and Burston groups are less dolichocephalic, euryprosopic, and platyrrhine than our total series, in which they resemble the Northwest-Victoria River division. This is true of several other indices and a number of measurements, though in stature there is a discrepancy, Campbell's people being shorter, and Burston's taller, than any of our subgroups.

TABLE 25. COMPARISON OF NORTHEAST AND NORTHWEST SUBGROUPS WITH OTHER AUSTRALIAN GROUPS

	1 Northeast (Warner)	2 Northwest (Warner)	3 North Australia (Burston)	4 North and Central Australia (Spencer and Gillen)	5 Central Australia-Arunta (Spencer and Gillen)
Number	77	99	62	21	20
Stature	166.98	169.62	170.52	172.52	166.30
Sitting height	82.03	82.02	83.30	....	....
Biacromial diameter	34.64	35.14	35.72	....	....
Head length	190.14	188.97	192.69	192.86	189.65
Head breadth	134.02	138.01	140.20	138.71	141.80
Head height	120.30	126.36	135.42	....	....
Minimum frontal diameter	104.62	104.78	112.30	....	107.21
Bizygomatic diameter	139.25	139.75	139.35	134.81	142.05
Bigonial diameter	103.46	105.26	105.70	105.67	98.45
Total face height	109.80	113.05	117.00	115.33	....
Upper face height	62.15	64.60	66.20	....	....
Nose height	46.54	48.54	48.86	48.76	50.79
Nose breadth	47.48	46.88	46.28	51.52	48.40
Relative sitting height	49.28	48.96	48.12	....	....
Relative shoulder breadth	20.70	21.26	20.98	....	....
Cephalic index	70.35	72.96	72.81	72.05*	74.65
Length-height index	63.23	67.01	69.98	....	....
Breadth-height index	89.78	91.25	96.32	....	....
Cephalo-facial index	98.03	95.15	93.44	....	100.18*
Facial index	79.48	80.98	84.06	85.86*	....
Upper facial index	44.63	46.37	47.72	....	....
Nasal index	103.90	98.06	95.82	106.57*	95.29*

* Calculated from the means of the measurements.

TABLE 25. COMPARISON OF NORTHEAST AND NORTHWEST SUBGROUPS WITH OTHER AUSTRALIAN GROUPS — *Continued*

	6 Central and South Australia-Arunta (Campbell and Hackett)	7 South Australia-Kookata (Wood-Jones and Campbell)	8 South Australia-Ooldea (Campbell and Lewis)	9 New South Wales-Kamilaroi, Brewarrina (Davenport)
Number	42	6	9	6
Stature	165.57	165.23	166.22	167.00
Sitting height	82.15	80.87	80.44	83.10
Biacromial diameter	36.05	....	34.42	....
Head length	192.48	194.67	192.00	196.50
Head breadth	143.20	143.33	139.11	146.70
Head height	127.29	122.33	114.67	....
Minimum frontal diameter	102.50	(114.50)	113.00	....
Bizygomatic diameter	141.05	137.50	138.44	....
Bigonial diameter	102.38	109.80	104.56	....
Total face height	114.55	111.67	114.22	113.00
Nose height	53.14	49.00	47.22	....
Nose breadth	50.06	50.00	49.33	....
Relative sitting height	....	49.46	49.17	48.22
Relative shoulder breadth	....	21.64	....	20.67
Cephalic index	74.28	73.67	72.67	74.70
Length-height index	66.14	62.67	67.62	....
Breadth-height index	89.00	85.33	93.62	....
Cephalo-facial index	92.51	96.00	99.56	....
Facial index	81.26	81.33	82.67	....
Nasal index	94.82	100.17	106.00	....

TABLE 25. COMPARISON OF NORTHEAST AND NORTHWEST SUBGROUPS WITH OTHER AUSTRALIAN GROUPS — *Continued*

	10 New South Wales-Kamilaroi (Taylor and Jardine)	11 New South Wales (Pöch)
Number	12	7
Stature	168.66	167.09
Sitting height	....	83.94
Head length	198.00	194.43
Head breadth	146.00	143.14
Head height	....	119.83
Minimum frontal diameter	....	106.86
Bizygomatic diameter	(133.00)	141.00
Bigonial diameter	....	109.00
Total face height	119.00	121.83
Upper face height	....	69.00
Nose height	47.00	49.50
Nose breadth	50.00	49.71
Cephalic index	73.60	72.62
Length-height index	....	60.87
Breadth-height index	....	84.48
Facial index	90.00	87.44
Upper facial index	....	49.52
Nasal index	108.00	100.07

For the rest of Australia there is very little actual material on the living subject.[1] Figures for seven other series, mostly mere handfuls, have been collected and tabulated; these are confined to North, Central and South Australia, and New South Wales. West Australia, Queensland, and Victoria are thus unrepresented, although records have been made in West Australia which have yet to be published.[2] Included with the above groups in the comparative table and the "mean differences" are the Northeast and Northwest Arnhem Land samples, the former as the largest series of what has been called the "northern section" and the latter as representing the Victoria River sample as well. Though not listed, the other groups must also be commented upon in making comparisons.

Table 26. MEAN DIFFERENCES IN 7 HEAD MEASUREMENTS OF NORTHEAST AND NORTHWEST SUBGROUPS AND COMPARATIVE SERIES

	1*	2	3	4	6	7	8	11
1....	..	1.90	3.11	3.69	4.01	4.11	2.27	5.42
2....	1.90	..	1.66	2.44	2.98	3.27	1.58	4.17
3....	3.11	1.66	..	2.30	2.68	2.89	1.61	2.65
4....	3.69	2.44	2.30	..	3.00	2.67	1.55	3.51
6....	4.01	2.98	2.68	3.00	..	2.91	2.33	2.85
7....	4.11	3.27	2.89	2.67	2.91	..	2.58	2.24
8....	2.27	1.58	1.61	1.55	2.33	2.58	..	3.39
11....	5.42	4.17	2.65	3.51	2.85	2.24	3.39	..

* Column numbers refer to those in Table 25.

It will be apparent that while the people of various parts of the continent vary to a certain extent among themselves, the information here presented does not reveal an orderly scheme of physical types, if any such exists. Furthermore, it is not possible to say how much of this variety is induced by the small size of the groups or by differences in the technique used by the several observers.

The stature of the Australians is homogeneous (165–168 centimeters), with one exception: central North Australia, including the Northwest and Victoria groups, contains people who are several centimeters taller.

The head length throughout North and Central Australia does not differ much from 190 millimeters. It is probably greater in South Australia and New South Wales, particularly the latter. The head breadth rises from north to south: it is lowest of all in the "northern section," more or less on a level throughout the rest of

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[1] See Appendix I.

[2] See Taylor, 1928.

North and South Australia, and highest in New South Wales. Although the means for head height in the south seem too low to be acceptable, the cranial material shows that a smaller difference in this character between north and south actually exists. (Cf. p. 36 ff.) In length and breadth, however, the head is larger in New South Wales than in the north. The cephalic index ranges between 72 and 74.7, excepting for the northern section of Arnhem Land, where all three groups indicate that it is an area of extreme dolichocephaly.

The minimum frontal diameter imparts no information. Several of the figures are undoubtedly too high, indicating mistaken technique. The bizygomatic breadth likewise reveals nothing, although, if the lowest figures are to be trusted, there is a total range in the means of 135 to 145 millimeters. Perhaps, as has been noted, the northern groups in the present series have wider faces than the southern groups. The bigonial breadth may be greater in the southern part of the continent. Both total and upper face heights and indices indicate that the face is shortest in the northern section, variable elsewhere except in New South Wales, where it is comparatively long (though Davenport's sample is not in agreement).

The nose is particularly short in the northern section, and relatively long in Central Australia; in the latter area, therefore, the index is somewhat lower than elsewhere. Furthermore, in the south the nose is the widest. In Australia, however, the nasal measurements vary a good deal, and in general they seem to be especially susceptible to errors of technique.

Mean Differences. These have been calculated from head measurements between most of the groups listed, without furnishing any further clues. In the present case this method must be a coarse sieve, due to the factors of small groups and uncertain technique. The figures seem to show in several cases that geography is a factor; i.e., that the more remote two groups are in space the more remote they are likely to be physically. However, this is probably due only to the peculiar features of the northernmost and easternmost groups, which we have already seen. Notice that there are hardly any mean differences greater than 3 except where these two groups (Nos. 1 and 11) are involved. On the other hand, geographically contiguous groups do not show any pronounced tendency to exhibit lower mean differences, except in the north, and it is possible that

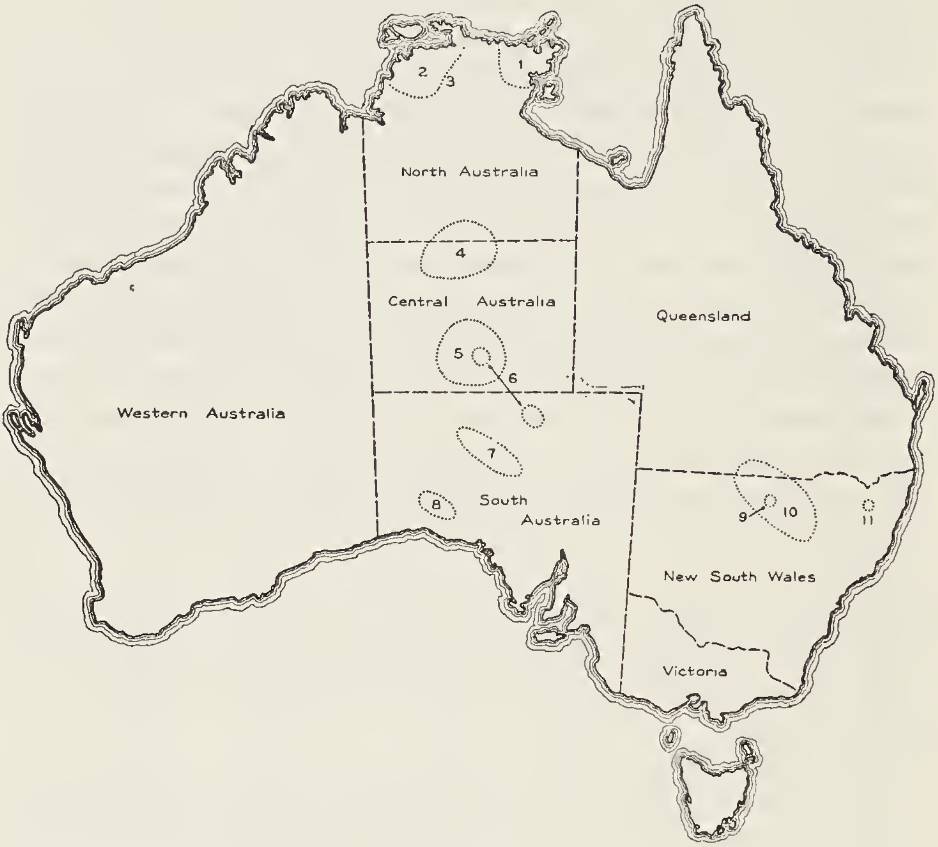

FIG. 2.

MAP OF COMPARATIVE SERIES

1	Northeastern Arnhem Land	
2	Northwestern Arnhem Land	
3	North Australia	Burston, 1913
4	North and Central Australia	Spencer and Gillen, 1904
5	Central Australia-Arunta	Spencer and Gillen, 1899
6	Central and South Australia-Arunta	Campbell and Hackett, 1927
7	South Australia-Kookata	Wood-Jones and Campbell, 1924
8	South Australia-Ooldea	Campbell and Lewis, 1926
9	New South Wales-Kamilaroi, Brewarrina	Davenport, 1925
10	New South Wales-Kamilaroi	Taylor and Jardine, 1924
11	New South Wales	Pöch, 1915

the small difference between the Northeast and Northwest groups is due partly to the fact that they come from one observer, so that no errors of technique are present.

Except for the Northeast group, that from New South Wales (No. 11 on the map) is the most isolated in a physical sense. This fact is due entirely to the long face of this sample, which is an important difference if it is an accurate one. The group from Ooldea, South Australia, has the smallest differences in all directions, as in all measurements it is quite intermediate (excepting the suspect head height and minimum frontal diameter) and is probably a good representative sample for Australia as a whole, in spite of its marginal position.

In physical features, the people of the north and east of Arnhem Land are the most divergent of all these living groups, particularly in their marked dolichocephaly but also because of their short faces and noses. The only other striking local features are the increased stature in central North Australia and the long face in New South Wales (which needs confirmation), but it is also apparent that the head and the nose increase somewhat in size as one goes from the north through South Australia to New South Wales.

With the possible exception of the long heads of the north and the long faces and low heads of the southeast, it does not seem as if any points of difference have been found which are not ascribable to the effects of variation and isolation working on a single people spread out over a vast area. If there are intrusive or successive elements in the population they have yet to make themselves manifest, for in spite of the apparent variation in such characters as the nose form, one finds nothing which can be exhibited as "un-Australian."

Statistical Variability. This question has been approached in the following way. The standard deviations of different characters of a group may, in a crude way, be corrected for differences in dimensionality, and be made comparable, by dividing each one by a "mean sigma" for that character obtained from the standard deviations of as many different samples as possible.[1] (In the case of most characters the mean sigma was calculated from fifty or more series, each containing more than fifty individuals.) This process gives for each standard deviation a "sigma ratio" or percentage indicating whether that standard deviation is high or low relative to the rank and file of different racial groups the world over. These sigma ratios may be pooled to provide a mean sigma ratio for the series in question. In the table below, the first column gives the mean sigmas for the characters listed, these being constant figures, applicable to any group, though in practice, series of less than fifty individuals give standard deviations which are too erratic to give information regarding biological variability.

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[1] See a paper by the author: "Some uses of the standard deviation in anthropometry," in "Human Biology," vol. 8, no. 4, pp. 592–600. Dec., 1936.

		Northwest		Northeast	
	Mean sigma	Sigma	Sigma ratio	Sigma	Sigma ratio
Stature	5.8	5.94	102.4	5.64	97.2
Head length	6.2	7.83	126.3	4.83	77.9
Head breadth	5.2	5.10	98.1	4.50	86.5
Minimum frontal diameter	4.9	5.12	104.5	4.60	93.9
Bizygomatic diameter	5.3	4.90	91.5	5.20	98.1
Bigonial diameter	5.8	5.80	100.0	5.32	91.7
Total face height	6.4	7.10	110.9	5.90	92.2
Upper face height	4.7	4.90	104.3	4.70	100.0
Nose height	3.8	4.64	122.1	3.52	92.6
Nose breadth	2.9	3.78	130.3	3.30	113.8
Cephalic index	3.4	2.88	84.7	2.85	83.8
Cephalo-facial index	3.5	3.72	106.3	4.26	121.7
Facial index	5.1	5.04	98.8	4.72	92.5
Upper facial index	3.6	4.08	113.3	3.48	96.7
Nasal index	7.8	9.68	124.1	10.12	129.7
Mean sigma ratio	..	..	107.9	..	97.9

The figure for Northeast Arnhem Land is quite usual, showing that the standard deviations are slightly less than average in size. However, a mean sigma ratio as high as that for Northwest Arnhem Land is likely to occur only when there is a pronounced reason, such as heterogeneity of sampling or a much-mixed racial type. Mean ratios of other groups for comparison are: Baining,[1] 100.2; Jakumul,[2] 92.2; Tjibitoeng, Java,[3] 99.4; Solomon Islands,[1] 104.7; Fiji,[1] 112.8. The figure for the total North Australian sample is 108.9, and for Burston's series it is 114.3. This latter is higher than that of Fiji, and the Fijians are Polynesian-Melanesian hybrids. However, it is doubtful whether hybridization increases variability in measurable characters, and whether variability indicates a mixture. It is probable that the high local degree of variation demonstrated both by Burston's and by Warner's Northwestern series means that the region (as well as the two series) contains slightly divergent local types, which when pooled produce an abnormally wide range. This is clearly the case with Warner's total sample, since it has been shown that the five subgroups differ from one another to a greater extent than random sampling would occasion. Therefore it is probable that Warner's Northwest sample contains a greater variety of local types than the means alone indicate, and it is plain that Burston's series, supposedly from Port Darwin, may contain a minority from the eastern part of Arnhem Land.

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[1] Howells, 1933.

[2] Schlaginhaufen, 1914.

[3] Nyessen, 1929.

Variation in Hair Form. Since he first became the subject of interested scientific discussion, the belief has been often voiced that the native Australian was not particularly homogeneous in type; that while he formed a distinct racial group, his external features nevertheless enjoyed such a wide range of variation as to suggest a heterogeneity of origin. Although this notion is far from prevailing, it is important as affecting various theories to explain the Australian population, and it therefore should be evaluated carefully.

The first voyagers to see the natives came off with contrasting impressions. Most found them highly unpleasant both in mien and behavior; others considered them, if not prepossessing, at least graceful, mild and amiable. But the question of differing types seems to be traceable mainly to Topinard and the hair form. In "L'Anthropologie" [1] he says: "Mais le type australien est-il pûr? Chargé en 1872, par la Société d'Anthropologie, de rédiger les Instructions aux Voyageurs en Australie, nous fûmes, tout d'abord, frappés des divergences de description entre les Australiens des côtes, des plaines basses, de quelque points isolés du 'bush,' de la region du nord-ouest notamment; et les Australiens en masse de l'intérieur, des plateaux, specialement de la region du nord-est." In an earlier work [2] he reviewed these descriptions from travelers which turn mainly on the form of the hair and employ a great variety of terms, both French and English; for other references to physical features are apt to be couched in abstractions (i.e. "kindly eyes," "forbidding visage"). It is quite true that the descriptions concerning separate locales do differ among themselves, recalling the descriptions of the elephant which the blind men gave. Topinard, therefore, believed that there could be distinguished in Australia an ogre-like woolly-haired element and a straight-haired, "beau" type, which had arrived in that order and fused in varying proportions to give the local varieties of Australians indicated by

[1] Topinard, 1877, p. 518.

[2] Topinard, 1872.

the accounts. De Quatrefages also asserted that there was a woolly-haired group in the vicinity of Adelaide.

Turner [1] did not agree that there existed either heterogeneity or woolly hair, and quoted Giglioli's suggestion that Topinard was misled by the "loose way in which the terms woolly and crisp" had been used by explorers. This is a suggestion which it is easy to accept when one reads Topinard's paper, and he admits himself the difficulty of giving an accurate interpretation and translation to many of the English descriptions.

When one looks for woolly hair in the precise figures and observations of recent years, it is not to be found, any more than are the fair-haired Polynesians of early stories. In a few localities the hair is predominantly curly, and occasionally strongly so, but over most of the continent it is very largely wavy. What seems ultimately to distinguish it from most of the forms of hair found in Melanesia is the absence of any frizzly or "crinkly" character. (This applies to head hair, for the beard in Australians often has this frizzled nature.) The percentage distribution of hair forms for Warner's groups in the north shows them to be almost entirely wavy or straight-haired, even curly hair being nearly absent. The same is true of the Central Australian (Arunta) sample of Campbell and Hackett, curly hair being uncommon here as well. Let us examine the data or notes on hair form of other authors who have published measurements. Spencer and Gillen have this to say regarding the tribes of central North Australia:[2] "It will be seen that in the matter of hair there is a very interesting series of variations. In the Arunta, it is always wavy and never truly curly, though occasionally the beard, which is always well developed, may be frizzled. In the Kaitish, it may occasionally be very curly. In the Warramunga it is normally wavy. In the Tjingilli it may be very curly. In the Suanji it is normally wavy, sometimes inclined to be curly, and is artificially made into a frizzled mop. In the Binbinga it is sometimes wavy, at others curly, and is plaited to form a kind of close-fitting skull cap. In the Anula and Mara it is, in both men and women, decidedly curly, approaching in appearance more nearly to the woolly type than in the case of any other tribe met with by us. It may perhaps be suggested that this indicates at some time a mixture with Papuan blood, but if so, the influence is apparently confined to this one feature." Again, concerning the Arunta:[1] "When fully developed it falls down over the shoulders in long and very wavy locks. . . . The beard is usually frizzy rather than wavy, and in some cases this feature is a very striking one; but we have never, amongst many hundred natives examined, seen one which could be called woolly." Basedow gives photographs of two individuals of Port Darwin with hair which is probably of the type Spencer and Gillen call very curly, which it certainly is. Stirling, writing of the Horn Expedition to Central Australia, as well as of other experiences, says of woolly hair:[2] "In no case did we observe, nor have I ever observed, the existence of this essentially negroid characteristic, which has nevertheless been mentioned as occurring in Australia. The most that was noticed was a slight waviness." The mention of woolly hair is that of de Quatrefages.

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[1] Turner, 1908, p. 388.

[2] Spencer and Gillen, 1904, p. 53.

In the two samples from South Australia, the hair is almost entirely wavy, three individuals in 28 from Ooldea having curly hair. There is again no trace of woolliness. Likewise among the Kamilaroi of New South Wales:[3] "Among twenty full-bloods only three had hair approximating to curly. The remainder had hair with a wave. We saw only one full-blood . . . with definite curly hair." Pöch says flatly:[4] "Die Australier sind schlichthaarig," but he illustrates one individual from New South Wales with strongly curled hair, which nevertheless could not be called woolly. On Cape York Peninsula, however, very curly hair seems to predominate, as described by Klaatsch (see Basedow) and as deduced from subjects illustrated by Mjöberg and by Roth. This type resembles the moppy hair of certain Melanesians, without being frizzly (as far as can be determined from the photographs); the curl is sufficiently strong to prevent its hanging about the face, though this may be due to its being cut short. This is probably of the same form as the curliest in North Australia, described by Spencer and Gillen, though one cannot be sure.

It seems clear, then, that no truly woolly or even frizzly head hair has been discovered among the living Australians. Throughout the continent, wavy or straight hair is typical, with a small proportion of moderately curly hair. In the north, however, as far as we can judge, strongly curly hair is to be found, in sporadic groups in North Australia, and commonly if not generally in northern

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[1] Spencer and Gillen, 1899, p. 38.

[2] Stirling, 1896, p. 17.

[3] Taylor and Jardine, 1924, p. 285.

[4] Pöch, 1915, p. 17.

Queensland. Such curliness was also early reported among the natives near Bass Straits in Victoria, but it is probably too late to investigate the accuracy of this. As for the north, the question is raised of the possible presence of some sort of Melanesian blood, most probably from New Guinea. Such an explanation for curly hair was rejected as preposterous by Basedow, who claimed that this curliness was simply an expression of the natural range of variation of hair form for Australia; but Basedow was endeavoring to show this range to be very wide, in order to be able to include the Tasmanians within it. All other authors accept the possibility of immigrants without giving it much consideration.

Cranial Material. Before the question of homogeneity and intracontinental variation is abandoned, the evidence furnished by cranial material must be considered. Let us take abstract homogeneity first.

Berry, Robertson and Cross [1] assailed the point by comparing sigmas and correlation coefficients of Australians, Tasmanians, and "Papuans," concluding only that the Tasmanians were purer than the Australians. Robertson [2] handled the same Australian crania (almost all from Victoria), and found that in length and breadth the sigmas were equivocal, the former being without the limits set by Pearson for ordinarily homogeneous series, the latter within them; he concluded therefrom that the Australians were medium in the matter of homogeneity. In any case the evidence is not very important. The means and sex-ratio of this series, however, led Morant,[3] probably justly, to question the accuracy of its sexing, which would affect the size of its sigma, since the inclusion of a large number of female skulls with the males would have the effect of amalgamating two frequency distributions whose means did not coincide, so that the sigma would of necessity be greater than that for a group of known males.

Morant [4] undertook a fuller investigation in the following manner. He assembled all the published measurements of Australian crania and pooled them, by political divisions, after making as certain as possible that all individuals contributing to any given mean measurement had been measured by the same technique. For the six territorial groups the numbers of available skulls varied from approximately 17 to 39, and due to differences in various authors' choices of characters only 19 measurements and indices could be employed for comparison. On this basis, Coefficients of Racial Likeness were found between all six groups, the nature of which led Morant to conclude forthwith that excepting those from the Northern Territory, all the Australian crania belong "to a single racial type which shows some slight local variation." The entire lot, therefore, with the exception of those from the Northern Territory, he pooled in a single series, designated Australian A.

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[1] Berry, Robertson, and Cross, 1910.

[2] Robertson, 1910.

[3] Morant, 1927.

[4] Morant, 1927.

Table 27. AUSTRALIAN MALE CRANIA
Data of Morant

	Queenland	New South Wales	Victoria	South Australia	Western Australia	Northern Territory
Approximate number	19	28	15	39	17	17
Capacity	1287.7	1287.7	1311.3	1319.6	1255.5	1224.2
Flower's length	185.1	187.0	186.9	187.0	186.9	180.2
Breadth	131.1	132.6	132.3	132.8	130.8	128.3
Minimum frontal diameter	95.2	96.7	96.7	96.1	96.8	94.3
Basion-nasion diameter	101.3	102.7	103.8	102.4	100.7	103.8
Basion-bregma height	133.3	136.1	134.3	131.5	132.6	132.8
Sagittal arc	375.7	372.8	379.2	369.4	373.0	361.1
Circumference	510.2	518.1	517.5	518.2	507.3	501.9
Foramen magnum length	34.4	34.7	35.3	35.8	35.1	35.6
Foramen magnum breadth	29.1	29.3	30.4	30.9	30.2	30.4
Bizygomatic diameter	131.9	133.4	135.8	134.6	133.2	134.2
Nasion-subspinale height	49.1	49.6	49.8	50.1	48.1	49.0
Nasal breadth	26.4	26.5	27.5	27.1	26.1	27.6
Orbit height	34.0	33.6	33.6	33.4	33.3	33.4
Length-breadth index	70.5	70.8	70.6	71.2	70.4	71.3
Length-height index	72.3	73.0	72.2	70.6	70.6	74.0
Breadth-height index	98.6	97.6	98.3	101.1	98.7	96.7
Foramen magnum index	84.5	84.2	85.7	86.4	85.4	85.3
Nasal index	54.7	54.2	55.3	53.8	54.7	56.7

The present author was desirous of examining further this assumption. Accordingly the deviations of each local group from the Australian A series in the means of 19 measurements and indices were found; these are set forth in Table 28 both in absolute size and in terms of their proper probable errors.[1] Table 31 gives a condensed tabulation of these differences in terms of probable error according to size. From these data one is led to the same conclusions reached by Morant. Of the five groups forming the Australian A series, only South Australia is possibly really aberrant, and even this is doubtful; at any rate, South Australia shows no connection with the Northern Territory in the Coefficients of

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[1] These are calculated from the σ of the Australian group A and the x_1 of the subgroup.

TABLE 28. DEVIATION OF TERRITORIAL GROUPS FROM AUSTRALIAN A SERIES WITH VALUE IN TERMS OF THE PROBABLE ERROR

DATA OF MORANT

Character	Queensland		New South Wales		Victoria		South Australia		West Australia		North Australia	
	Diff.	x p.e.	Diff.	x p.e.	Diff.	x p.e.	Diff.	x p.e.	Diff.	x p.e.	Diff.	x p.e.
Capacity	6.9	.4	6.9	.5	16.7	.9	25.0	1.9	39.1	2.2	70.4	3.7
Flower's length	1.3	1.3	.6	.7	.5	.5	.6	.9	.5	.5	6.2	6.0
Breadth	1.1	1.4	.4	.8	.1	.1	.6	1.2	1.4	1.9	3.9	4.9
Minimum frontal diameter	.9	1.1	.6	1.0	.6	.7	.0	.0	.7	.8	1.8	2.0
Basion-nasion diameter	.8	1.2	.6	1.1	1.7	2.3	.3	.7	1.4	2.3	1.7	2.4
Basion-bregma height	.2	.3	3.0	4.8	1.2	1.4	1.6	3.2	.5	.7	.3	.4
Sagittal arc	2.7	.9	.2	.1	6.2	1.7	3.6	1.8	.0	.0	11.9	4.8
Circumference	5.4	2.3	2.5	1.3	1.9	.6	2.6	1.5	8.3	2.5	13.7	4.9
Foramen magnum length	.8	2.0	.5	1.5	.1	.2	.6	2.1	.1	.3	.4	1.0
Foramen magnum breadth	.9	2.4	.7	2.3	.4	.9	.9	3.6	.2	.6	.4	1.1
Bizygomatic	1.7	1.8	.2	.3	.8	.8	1.0	1.4	.4	.5	.6	.6
Nasion-subspinale height	.4	.8	.1	.2	.3	.6	.6	1.7	1.4	2.5	.5	.9
Nasal breadth	.5	1.7	.4	1.3	.6	1.8	.2	.9	.8	2.3	.7	2.1
Orbit height	.5	1.6	.1	.3	.1	.3	.1	.4	.2	.6	.1	.3
Length-breadth index	.5	1.1	.2	.5	.4	.8	.2	.7	.6	1.2	.3	.6
Length-height index	.7	1.4	1.4	3.1	.6	1.2	1.0	3.0	1.0	1.9	2.4	4.7
Breadth-height index	.7	.9	1.7	2.7	1.0	1.1	1.8	3.4	.6	.8	2.6	3.0
Foramen magnum index	.5	.5	.8	.9	.7	.6	1.4	2.1	.4	.4	.3	.3
Nasal index	.1	.1	.4	.6	.7	.8	.8	1.4	.1	.1	2.1	2.5

Racial Likeness. Elsewhere the subgroups do not differ from the total more than would samples drawn at random from the A series with no regard to geography. The Northern Territory, however (which includes the present-day Central Australia), can be regarded as statistically distinct from the rest of the continent.

Table 29. DIFFERENCES OF TERRITORIAL GROUPS FROM AUSTRALIAN A SERIES TABULATED BY SIZE AS EXPRESSED IN TERMS OF THE PROBABLE ERROR

Data of Morant

19 Measurements and Indices

	0–1	1–2	2–3	3–4	4–x
Queensland	7	9	3	0	0
New South Wales	10	5	2	1	1
Victoria	13	5	1	0	0
South Australia	7	7	1	4	0
West Australia	11	3	5	0	0
Northern Territory	6	2	4	2	5
Probability	9.50	6.13	2.55	.68	.12

It is correct to object to this demonstration that there is no reason why boundary lines surveyed by white colonists should bear any relation to somatological divisions among the aborigines, and that a tract as extensive as Western Australia may contain several types which nevertheless cancel each other's individuality when taken all together. To determine such a question calls for intensive study upon relatively restricted areas, or at any rate, a number of sizeable samples each of which is drawn from a single locality. This is the only way, for example, to tell whether the element which renders the Northern Territory physically peculiar is confined to this state or extends somewhat into Western Australia or Queensland. Nevertheless, the very fact that the political divisions constitute a more or less arbitrary splitting up of the native population without producing any recognizable distinctions even between the mutually most remote (always excepting the Northern Territory) seems a valid argument for the homogeneity of the population as a whole.

Morant compares the coefficients of variation of the Australian A series with those of the Egyptian E series (26th–30th Dynasty) and a series from a 17th century cemetery in Farringdon Street, London. The Egyptian series is remarkable for its homogeneity, and its coefficients are exceeded by those of the Australians in almost all characters. The English constants exceed the Australian ones about as often as they fall below them in 24 characters, which is to say that, judged on this basis, variability is quite comparable in both groups. Morant believes the constants of the English crania "may be considered typical for a racially homogeneous European population," which is perhaps a questionable badge of homogeneity. On the other hand: "The population which extends over the greater part of a continent is less variable than a collection of individuals from a single London cemetery." One thing must be remembered, which is that low variability is not necessarily exactly the same thing as racial homogeneity, for other conditions besides the latter may govern variability, such as climate. As Morant points out, a racially homogeneous group might well have an inherent variability as a racial characteristic.

Metrical Characters of the Cranium. Let us examine the measurements themselves. The Northern Territory group, though divergent, is only moderately so. Of the 19 characters provided, only in 7 may the deviation from the total A series be called significant, these being capacity, Flower's length, cranial breadth, circumference, sagittal arc, and the length-height and breadth-height indices. All of the measurements deviate in a minus direction, so that the total resultant differentiation lies in a smaller cranial vault. The nasal index is slightly but insignificantly higher, though no corresponding differences are to be seen in the nasal measurements.

Table 30. AUSTRALIAN MALE CRANIA

Data of Hrdlička

	South Australia	Northern Territory	Victoria	New South Wales	Queensland
Number	198	108	74	59	52
Glabello-occipital length	190.9	185.5	190.8	190	186.7
Maximum breadth	133.1	129	134.4	132.7	131.3
Basion-bregma height	130.7	135.2	136.8	134.6	136.2
Bizygomatic diameter	135.6	135.2	138.8	134.5	134.6
Face height	114.5	112.5	113.2	114.7	113.2
Upper face height	69.6	69	71.1	69.7	68.4
Orbit height	33.5	33.2	33.2	33.2	33.5
Orbit breadth	38.6	39	39.2	39	38.7
Nose height	48.5	49	48.8	48.9	48.6
Nose breadth	26.7	27.4	27.9	27.9	27.5
Palate length	62.5	61.5	62.4	62.3	60
Palate breadth	68.3	67.2	69.1	69.2	67.8
Cranial index	69.7	69.6	70.4	69.9	70.3
Facial index	84.3	83.2	82.3	85.2	84.8
Upper facial index	51.2	51	51.2	51.4	50.9
Orbital index	86.8	85.1	84.7	85.1	86.6
Nasal index	55	55.9	57.2	57.1	56.6
Palatal index	109.3	109.3	110.8	111.1	113

The cranial index does not differ from that of the total. Finally, the height of the cranium is least in South Australia.

Though it has not been closely analysed, the material of Hrdlička [1] is more satisfactory, since it was obtained by a single observer. For the most part his 500 male crania do not coincide with or include the material compiled by Morant, being all in Australian Museums. The interregional differences seem to be of the same order and kind as those found by Morant. The length and breadth are definitely less in the North and next smallest in Queensland and Western Australia. There is hardly any variety in the cranial index. The height is strikingly less in South Australia than elsewhere. The face is somewhat longer in South Australia and New South Wales, a difference which is not apparent in the upper facial height. The most platyrrhine regions are New South Wales and Victoria, differences in general nose size being imperceptible.

The contrast between the north and the rest of the continent is not so marked as in Morant's work, but the differentiation of the north seems clear. Furthermore, the variations recorded above are almost entirely the same as those which were found on the living material, even though some of the trends are so slight as to be very questionable. One phenomenon remarked in the living is not shown by any of the cranial material; this is the lower cephalic index in the northeast portion of Arnhem Land, or from Melville Island around to the Roper River. It is possible to obtain two subseries, each of 13 crania, from Hrdlička's material, one from Melville Island and one from Anson Bay, which is between Northwest Arnhem Land and Victoria. The mean cranial indices are, respectively, 68.54 and 68.95, but the difference, while corroborating that found between the living of these areas, is too small to constitute real evidence.

Head Height in South Australia. The subject of the head height in South Australia merits further consideration. Both of the above groups of crania show it to be definitely less than elsewhere, and the fact has been commented upon by several authors. Turner remarked that in the south very often "the vertical index is less than the cephalic," which was not so in the north.[2] Duckworth, seriating the head height of a small group of crania from South Australia, found a double-humped frequency distribution.[3] This does not appear in a seriation of Hrdlička's figures. Neither author, however, considered this difference evidence for the presence of two racial groups, either within South Australia or the whole continent, in the absence of other differences, which is a rational view. The head height is also responsible for Dixon's findings that his "Proto-Australoid" type predominates in the south while the "Proto-Negroid" preponderates in the north, since these two types are differentiated by the length-height index. This fact led Dixon to postulate two separate successive groups of aboriginal immigrants.[1]

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[1] Hrdlička, 1928.

[2] Turner, 1884, p. 48.

[3] Duckworth, 1904.

Blond Hair in Australians. Although its relations to this discussion are doubtful, a phenomenon which should not go unmentioned is the sporadic or even frequent occurrence of light hair in many parts of Australia. Shades from dark brown up to a yellow-brown or straw color are reported, the latter being the rarer and in general restricted to juveniles. Hrdlička has seen it in several localities, and has discussed the phenomenon.[2] Mathew reports one or two cases from Queensland. Taylor[3] found "tawny" hair common along the western edge of the desert in Western Australia, particularly among children, but also in about half the women. Basedow[4] and Stirling both report varying shades of a color lighter than black to be common among children, but not adults, in parts of Central Australia. Two points are emphasized in several of the above works: the blond hair is not due to artificial bleaching, as in Melanesia; and the light color is most marked at the hair tips, seldom extending to the roots, a fact which does not indicate a very deep-seated blondism.

No explanation has been offered for this phenomenon. Juvenile blondism in European children is apparently the passing expression of a recessive character derived from mixed parentage. Does this indicate a fair-haired element and a mixed ancestry for the Australians? The evidence is somewhat against the probability that the light color comes from within. Possibly the manifestation rests on a purely genetic basis (cf. the "White" Indians of Panama[5]) such as a mutation which allows the hair to bleach out readily on exposure to the sun. At all events, pigmentation is a feature which in most animals is very susceptible to the caprice of the gene.

Summary of Findings. Concerning geographical differences in physical features, there are certain points on which the two compilations of crania and the material on the living are in agreement.

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[1] Dixon, 1923, pp. 374–376.

[2] Hrdlička, 1926.

[3] Taylor, 1924.

[4] Basedow, 1925.

[5] See Harris, 1926.

Principally, the head is smaller in length and breadth in North Australia, and particularly, according to the present data, in the northeast coastal portion. Although the data on the living are equivocal, the head seems to be lowest in South Australia, an oft-remarked fact. There are also slight but persistent indications that in the south the face is longer and the nose more platyrrhine, particularly in New South Wales. It should be noted, though the data are not reproduced here, that the female crania both of Morant and Hrdlička support the above observations on the cranial length, breadth, and height, and to some extent the others as well.

The living material furnishes two other points. There is an area of taller stature in central North Australia, and an area of extreme dolichocephaly comprising Melville Island and the north coast.

As to the homogeneity of the Australian population as a racial group, we may appeal again to the same data and point out with what great difficulty any regional differences can be established at all. Furthermore we find that local differences in a small area, such as that covered by the present material, are as pronounced as those between Morant's and Hrdlička's territorial divisions. Indeed Morant's groups were not found to differ even to a significant degree, though his method of pooling the figures of many authors may have generalized each of his groups to the extent that actual differences between them were hidden.

Statistical constants furnished by the crania indicate a variability neither high nor low, even though all but the Northern Territory is included. The standard deviation on the living is equivocal: it is low on the average for Central Australia but moderately high for North Australia, while there is no general sample for the whole continent. Probably local variation within North Australia is greater than within any other state.

Discussion. There are three explanations which may be offered for what departures from a dead level of physical uniformity are found. One, offered by Topinard, Dixon, and others, postulates two groups of aboriginal invaders who did not mix everywhere in the same proportions. Now the actual circumstances are not what Topinard supposed them to be, and while the south is differentiated by head height, as Dixon found, other differences are small and irregular, which does not indicate the presence of two types sufficiently discrete to be defined as such.

Another explanation lies in the possible intrusion of peoples from outside, not throughout the population, but only in sufficient amounts to modify the natives of a particular portion. It is incredible that some foreign blood should not have been introduced into the north of the continent, but it nevertheless appears that such admixture has had no effect upon the Australian type as a whole. Smyth states that intercourse and intermarriage take place constantly across Torres Straits, and continues: "The infusion of Papuan blood may not have entirely changed the character of any tribe, but it is there; and it is apparent where the Papuans have never been"; that is, diffused somewhat further south.[1] "On the northwest they have been visited periodically, for how many years no one can tell, by the Malays." Spencer,[2] however, doubts that the Malays have had the slightest influence, relating the danger which any intruder runs simply by his presence there, let alone in approaching a woman.

Finally, the most obvious hypothesis is that isolation and an unquestionably long lapse of time are accountable for the situation as it is found. Although this period of time seems to have brought definite regional deviations, none of the groups yet reported could properly be called typologically distinct. The one remarkable phenomenon is that an entire continent should be so homogeneous, while New Guinea, close on the north, teems with physically contrasting peoples. Next to Australia, North America probably has the simplest racial complexion, and it is instructive to contemplate the variety of types which might be found in any equal area of the latter. Even the Eskimos, taken by themselves, can hardly be compared with the Australians.

All that can be established at present, then, is that in a few characters certain regional differences obtain, and that the people of North Australia are the furthest removed from the general type.

COMPARISONS WITH OTHER RACIAL GROUPS

The origin of the Australians has always been one of the most absorbing topics of human phylogeny. Here in Australia is found the most primitive existing physical type combined with the most primitive material culture; yet these people have been able to

[1] Smyth, 1878, p. xvii.

[2] Spencer, 1914, p. 8.

formulate and administer the most formidable systems of kinship known to anthropology.

What, then, are their relationships with the rest of Homo sapiens? Several authors to the contrary, there is little reason to suppose that the physical type we recognize as Australian evolved in Australia, or that it has always been confined to Australia. There is an analogy in the American Indian: nobody now claims that he evolved in the New World; however, the facts in this case are more obvious. As with the Indian, one must search out the Australian's remote past by looking among other groups for people who may be related to him. There are suggestions that an "Australoid type" was once an important element in the populations of other parts of the world, even in America; the calvarium from Punin, Ecuador, is a case in point. Our task is therefore to find indications of the former range of the Australian type, before any estimate can be made as to the time and extent of its greatest importance.

As a preface to comparisons, the physical type of the Australian must be recapitulated. Of its external features the combination of a very black skin with hair that is not frizzly, but wavy or curly, is the most noteworthy. The long, narrow, keeled cranium with its beetling brows is another characteristic complex. The mouth region, with its long lips, projecting alveolar processes, large palate, and receding chin, is another. The nose is very short and bulbous, with wide and thick alae. The cumulative effect argues strongly for the theory that the Australian is a survivor from an actual level in the morphological development of man, and not merely a peripheral subracial type.

Metrical characters are a very dolichocephalic head and a nose which on the living is as broad as it is long. The face, though not extreme, is moderately broad and short.

In comparing the mean measurements of Australians with those of other peoples, the mild diversity which obtains between the several series raises somewhat of a difficulty, since some kind of choice must be made for a representative group. It would be improper to use the total North Australian series, since the evidence shows that some of the divisions (of this series), considered from the viewpoint of the whole continent, are aberrant, while the Northwest and Victoria groups are quite typical. Since greater discrimination does not seem to be called for, we shall therefore use the means for the Northwest group, which is the larger of the two, and round these figures off to the nearest unit. Compared to the remainder of Australia, this furnishes a group which is a little taller and has a head which is slightly shorter and narrower. Therefore, for head length and breadth a range is given rather than a mean. Otherwise, and on the whole, the approximation to the average seems good. It would be inadvisable to attempt to select representative means for all Australia, for many of the series are too small to be trustworthy, and since there are slight local differences, it seems better to have some geographical point of reference.

Melanesia. Australia's horizon is occupied on the north and east by Melanesian islands, of which New Guinea and New Caledonia are the nearest. The area occupied by the Negroid peoples of the Pacific is by nature that which should be first examined for evidence of present relationship with or past occupancy by the Australians.

Means are given in Table 31 for a number of Melanesian groups. These are not primarily representative of the peoples of Melanesia but are rather the only groups which approximate at all to the measurements of our Australians. Other groups may be discussed without quoting figures.

New Guinea, Australia's nearest neighbor, and nearly continental itself in proportions, affords little among its many types that might be referred to the Australians. The interior, only partially explored, is a logical refuge area where remnants of a possible former population of Australians might be looked for. But the typical inhabitants of the central portion [1] are very short, brachycephalic, and quite un-Australoid in all ways. While they differ in some respect from the Negritos of the Philippines and the Andamans, especially in a less platyrrhine nose, they must be accepted as pygmies and are probably slightly modified Negritos. The interior of the eastern part of the island, according to latest information mostly not yet recorded, appears to contain taller people who are like the coastal tribes.

The data for the south coast of New Guinea, in closest proximity to Australia, are poor.[2] The people are medium or tall of

[1] Cf. the Tapiro series (22) of Wollaston (1912) and the Goliath (12), Pesechem (44) and Morup (12) groups of van den Broek (1913, 1923). The first two named have mean statures of less than 150 centimeters.

[2] Koch, 1907; Haddon, 1915–1916. These are all groups of less than 20 men, and few measurements are given.

stature, and medium or long-headed, although pronounced brachycephals are found at the mouth of the Fly River. From Merauke is provided a series which is as close to the Australians as any which can be found, but the nose, an important character, is relatively narrow, in other groups as well as this. The face, too, is in this region generally narrower than in the Merauke sample, thus diverging from the Australians.

For the north coast, somewhat better material is available.[1] On the western part, the Bongko furnish another group which slightly resembles the Australians, but which, however, again differs from them in the face width and nose form. On the eastern part of the north coast, only in the village of Jakumul is there found a resemblance to the Australian averages. Elsewhere the cephalic index is higher. Reference to the material as a whole reveals a considerable variation in type; the two series named happen to be the most like the Australians in their measurements, but the prevailing type is very much like that of eastern Melanesia, as exemplified by the series from the Solomon Islands, given in the table, i.e., mesocephalic and not very platyrrhine.

The Bismarck Archipelago is a complex area in itself. Most of the information about living peoples concerns groups in southern New Ireland,[2] but it reveals little regarding the Australian question.

The Baining and certain other tribes are thought to be the oldest discernible stratum. While these people have a high nasal index, they are short of stature and brachycephalic. On the northeast tip of New Britain, however, there is a type which, in certain ways, does recall the Australians. This comprises Melanesian-speaking people who are believed to have invaded the region from New Ireland.[3] The small sample from Ralum is composed of men measured at Berlin, at the Deutsche Kolonial-Ausstellung of 1896. While the measurements indicate them to be larger in every respect than the Australians, the head, face, and nose indices are very similar. It is justifiable to ascribe the large size of the Ralum men to the choice

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[1] The principal series are: Cape Nelson (30), Potsdamhafen (34), Kai (57) (Bondy-Horowitz, 1932); Humboldt Bay (18), Lake Sentani (22) (van den Sande, 1907); Leitere (21), Arup (20), Torricelli (30) (Schlaginhaufen, 1914); Swarts River (27), Biak I. (28), Doreh Bay (10) (Wirz, 1924, 1925).

[2] Except for records of a few measurements by Chinnery from southeast New Britain, the material is supplied by Friederici (1912) and Schlaginhaufen (1908, 1910), comprising several series ranging in size from 10 to 30, except for a group of 78 Baining.

[3] Parkinson, 1907.

Table 31. AUSTRALIANS COMPARED WITH PACIFIC GROUPS

	Australians		New Caledonia			Uvea, Loyalty Islands	Santa Cruz	Solomon Islands	New Guinea			Ralum, New Britain
			Total	North[1]	Kanala (S. E. coast)				Bongko	Jakumul	Merauke	
Author			(Sarasin)	(Sarasin)	(Sarasin)	(Sarasin)	(Speiser)	(Howells)	(Bijlmer)	(Schlagin-haufen)	(Koch)	(von Luschan)
Number			185[4]	67	25	30	34	85		100	46	7
Stature	170	....	...	164.45	170.8	168.4	160.3	160.20	160	158.2	164.9	171.76
Sitting height	82	....	...	......	....	....	....	83.59	....	....	....	.....
Biacromial diameter	35	....	....	.....	....	....	35.9	....	....	....	37.8	.....
Head length	189	(−192)	192.5	197.13	186.7	199	188	188.46	189.1	190.7	188	200.29
Head breadth	138	(−142)	147	142.29	152.3	148	144	144.73	136.2	141.2	141	146.71
Head height	126	....	...	.....	....	...	122	.....	....	....	...	.....
Minimum frontal diameter	105	....	...	.....	....	...	100.7	.....	102.1	101.7	118[2]	105.43
Bizygomatic diameter	140	....	143.1	140.40	144	143.8	141	137.95	135.5	137.6	139	145.43
Bigonial diameter	105	....	....	.....	....	....	98.4	.....	102.6	102.4	106	109.00
Total face height	113	....	114.9	114.69	114.3	117.6	109.5	116.40	114.7	112.2	113	116.86
Nose height	49	....	47.85	46.78	48.8	48.1	....	49.86	53.4	50.6	51	51.57
Nose breadth	47	....	47.34	47.62	47.3	46	46	44.60	43.6	44.0	38	48.42
Relative sitting height	49	....	...	....	...	...	...	52.12	...	...	....	...
Relative shoulder breadth	21	....	...	....	...	...	22.4	....	...	...	22.9	...
Cephalic index	73	....	76.5	72.10	81.7	74.4	76.5	76.80	72.2	73.5	74.94	73.3
Length-height index	67	....	...	....	...	...	64.7	....	...	...	69.40	...
Breadth-height index	91	....	...	....	...	...	84.7	....	...	...	....	...
Fronto-parietal index	76	....	...	....	...	...	70.2	....	75	71.7	....	...
Cephalo-facial index	95	....	97.35[3]	98.67[3]	94.55[3]	...	98.3	95.36	100	97.8	98.58[3]	...
Zygo-frontal index	75	....	....	....	....	...	71.4	....	75.36[3]	73.3	84.6	72.49
Fronto-gonial index	101	....	....	....	....	...	97.3	....	100.49	100.69	....	...
Zygo-gonial index	75	....	....	....	....	...	69.4	....	75.8[3]	74.0[3]	76.2	...
Facial index	81	....	80.4	81.71	79.5	81.8	78.0	84.54	84.8	80.8	81.29[3]	80.74
Nasal index	98	....	99.3	102.18	97.5	96.2	...	87.14	82	86.8	74.50	94.06

[1] Calculated by the author from nos. 1–67 in Sarasin's tables. Includes territory north of Ouanga and Ouaieme Rivers.
[2] Extraordinarily high; probably not obtained by standard technique.
[3] Calculated from the means.
[4] This does not include the Loyalty Islands.

of good physical specimens for the exhibition. The reason for this is that a series of crania from the same place measured by the author but not yet published tallies very well in its metrical characters with the Australians (cf. Tables 31 and 32).

TABLE 32. GROUPS OF CRANIA OF MELANESIA

	Ralum	Gazelle Peninsula	North New Caledonia	Hienghene North Central New Caledonia
Number	101	11	22	14
Author	(Howells)	(MacCurdy)	(Sarasin)	(Sarasin)
Cranial length	184.09	182	187.3	185.4
Cranial breadth	131.06	130	129.2	130
Bizygomatic diameter	135.93	133	135.15	135.8
Face height	113.82	..	115.45	..
Nose height	48.42	48	48.3	48.6
Nose breadth	26.85	27	27.3	26.8
Cranial index	71.25	71	69.1	70.3
Facial index	83.71	..	86	..
Nasal index	55.57	57	56.7	55.2

In the central portion of Melanesia, as has been mentioned, no notable likeness to the Australians can be detected anywhere. The samples from the Santa Cruz and Solomon groups, given in Table 33, are neither sufficiently dolichocephalic nor sufficiently platyrrhine to warrant attention, and the same applies to the people of the New Hebrides.[1]

New Caledonia and the Loyalty Islands form a center of particular interest in the discussion. The figures for the total series, measured by Sarasin, would be misleading alone, since there is a striking difference between the northern and southern portions of the island; a difference of nearly ten units in the cephalic index. The face is somewhat wider and the nose less platyrrhine in the south, but these are trivial differences by comparison. Sarasin explained these phenomena as variations of an originally homogeneous type. However, Polynesian influence is suggested as being responsible for the brachycephaly of the south by the presence of Polynesian languages in the Loyalty Islands, although one might expect such an influence markedly to have reduced the nasal index, which has not been the case.

However this may be, it is apparent that the people of northern New Caledonia stand closer in measurements to the Australians than any Melanesian group so far reported. The larger head diameters are the only important deviation. The southern part of the island has nothing in common with Australia except a high degree of platyrrhiny; however, in Uvea of the Loyalty Islands, although the measurements denote a larger head and face, the indices approach what we are looking for.

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[1] Speiser, 1928.

In these various comparisons only measurements and indices have been considered. On this basis there are a few groups whose pattern is like that of the Australians; these are found in northeast New Britain, northern New Caledonia, and a few places on the coast of New Guinea. In the case of the last-named, however, the nasal index does not conform, being much lower, and when these groups are taken together with their nearer neighbors, the Australoid aspect of their measurements appears to be quite fortuitous.

The people of Ralum and New Caledonia have the extreme platyrrhiny and the low cephalic index which one associates with the Australians, although the agreement in size is a little dubious. Nor do comparisons of the crania aid the discussion much. In the first place, the absolute measurements on the living (Australian) are very little greater than those on the skull. Either his soft parts are exceedingly thin, or his recent existence is more unfavorable to bodily development than his former one, in spite of missions. However, if the means in Table 32 are compared with the Australian figures in Tables 27 and 30, it is seen that the inter-group likenesses are stronger than those given by living subjects. At any rate, these are the best of such likenesses to Australian crania which the published material affords.

There are other aspects to this comparison besides the metrical. Photographs of the subjects of both the Ralum and New Caledonian series are given in their respective publications. There is very little in the physiognomy of the Ralum natives that resembles the Australian. The hair is woolly, and the conformation of the nose and mouth is on a higher aesthetic level, although the alae of the former are wide and flaring and the brow-ridges are heavy. None of the individuals pictured would be mistaken for an Australian. This is not true, however, of the population of north New Caledonia; here one immediately gathers from the photographs an impression of both Australoid and un-Australoid types, the former being in certain cases particularly striking. The large, bulbous tip of the nose and the unshaped lips, both characteristically Australian, are frequently to be seen. Furthermore, there is considerable body hair, which may or may not be a feature of the Ralum population. The latter has at least a woolly beard of moderate size.

Like the face, the Australian type of cranium occurs frequently among the people of the two regions considered. Very few Australian skulls could be mistaken by the practised observer for another type. The conformation of the brow-ridges and forehead, the peculiar profile of the vault, the horizontal orbits, and alveolar prognathism combine to give the skull a characteristic aspect. Approaches to such a type are found to a small extent among skulls of New Guinea, but for the most part they look very different: the forehead is smoother and more bulbous (i.e. more "Negroid"), while in general the contours are different. Of the Ralum crania, however, a large number resemble those of Australians in type, while about one in ten could readily be mistaken for a true Australian. From photographs this statement appears to apply equally well to the New Caledonian crania.

This is little material from which to surmise how far the Australian type may have been extended, or have affected the other Melanesians. If the Australian type is present as an initial element in the people of New Guinea and Melanesia, and if the nasal index has been lowered by Malay blood, then the hair should not have become woolly, but should be even straighter than before. Hence the presumption that the Australian and the Melanesian are fundamentally different dark-skinned strains. In the two areas where the nasal index is equally high, the form of the hair remains a highly un-Australoid feature. In the same way, the crania show but a few morphological characters like Australians, again excepting those of New Britain and New Caledonia.

There is thus no tangible evidence that an Australian type had anything to do with the formation of the people of either the eastern part of Melanesia or New Guinea.[1] Nevertheless, it is necessary to consider the inference that Australians were once present in New Guinea, since some of the people of the Bismarck Archipelago and of New Caledonia have similar metrical characters and many of their crania present the same peculiar appearance. Ralum is at the northern end of New Britain, on the opposite side of New Guinea from Australia. And if the Australian type was able to get to New Caledonia, it may even have gone further.

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[1] It should be mentioned that curly hair occurs frequently on the southeast coast of British New Guinea, as does also a light skin color (Seligmann). The tribes, however, speak Melanesian languages, and are probably recent immigrants from another part of Melanesia or from Indonesia; there is much better reason to ascribe the hair form to some sort of Mongoloid or Polynesian infusion than to an Australian element.

There are strong negative inferences as well. If the Australians entered their domain through New Guinea, they should certainly have left marked traces behind. Even though one supposes that New Guinea subsequently served as a vestibule to the rest of Melanesia, the interior should have saved some Australian remnants from the inroads of invaders; instead, it harbors pygmies.

The people of Ralum and New Caledonia both speak Melanesian languages, of the Malayo-Polynesian family. It is plain that these languages are more recent in the Pacific than the "Papuan,"[1] non-Melanesian tongues of much of New Guinea and the western islands. Furthermore, none of the latter has been in any way allied to the Australian languages. Thus in New Britain and New Caledonia we are confronted with a supposedly archaic physical type speaking the most modern of the languages. This objection is not a great one, however: if the two groups are partly Australian, they are also partly something else, and this other strain would have brought the prevailing language.

Where there is smoke, there must be some fire. Only in Ralum and northern New Caledonia does there exist the combination of dolichocephaly and extreme platyrrhiny characteristic of the Australians, and in the latter place the physiognomic resemblance as well. On this basis either the evidence of common descent will have to be dismissed or the implication will have to be swallowed that the Australians were able to penetrate beyond Australia to New Caledonia and possibly further. The only other explanation (for both Ralum and New Caledonia) is that they were already mixed groups when they arrived in their present homes, and here the fact that they speak Melanesian languages becomes a real obstacle. Such a theory would imply that the Melanesian languages were earlier than the non-Melanesian languages in the Western Pacific, whereas the weight of evidence is against this belief.

Indonesia. The Indonesian area has been given more consideration somatologically than Melanesia,[2] and less groping will be necessary in the search for clues to an Australian-like element. The best-

[1] This term cannot at present be given any racial connotation.

[2] For material and discussion see Sullivan, 1918; Dixon, 1923; Kleiweg de Zwaan, 1925.

accepted theory supposes that at some time an Australian (or at least proto-Australian) type of man moved out of Asia and across the Indonesian islands to Australia. On such an assumption one might not expect to find this type in Melanesia, but Indonesia should be examined most carefully.

In certain respects students are in general and well-founded agreement as to the elements in the population of the area (which for our purposes will include the Malay peninsula). There is a perfectly definite Negrito stock, which comprises the whole population of the Andamans, and which appears in the hinterland of the Malay States and of the Philippines. This is characteristically very short of stature, woolly-haired, generally brachycephalic, and it has a low broad nose with an index over 90. In nearly all of these respects the type is one with the New Guinea pygmies. (The one difference lies in the mesorrhine nose of the latter.) The present existence of Negritos in Borneo or Celebes is denied by all, with only a few authors considering the possibility for Java and Sumatra. Nevertheless the inference is obvious, and disputed by none, that they must formerly have been present in almost all of the above islands.

The second readily isolable type in Indonesia is the Malay, presumably an immigrant from Asia and the last to arrive. It has as typical features very straight and black hair, a strongly Mongoloid countenance, brachycephaly and a lower nasal index and lighter skin than all other peoples. This is now the dominant element in the area, having appropriated the coastal regions of most of the islands, particularly in the west and north.

A different atmosphere is engendered by discussion of the peoples who do not belong to the above classes. Particularly is there a difference of opinion regarding the supposed stratum designated Indonesian, Ur-Malay, pre-Malay, or proto-Malay, and conceived of still more variously than it is named. Its most generally accepted traits are a sort of negative Mongolism, hair which is straight or wavy, and black or dark brown, a darker skin than the true Malay, a high nasal index and an occasional tendency toward dolichocephaly. Its habitat is generally inland relative to that of the Malay proper; and to it are assigned such peoples as Battaks, Dayaks, Toradjas, etcetera.

Several authors deny the existence of this Indonesian (proto-

Table 33. AUSTRALIANS COMPARED WITH PEOPLES OF INDONESIA

	Australian	Kroenese	Beloenese	Toala	Toradja (Bugi, Maccasar)	Sumatra Sakai (Ajer Gumai)	Sumatra Akett	Malay States Semang	Malay States Sakai
Number		50	107	20–25	17	43	13	c.13	78
Author		(Bijlmer)	(Bijlmer)	(Sarasin)	(Sarasin)	(Moszkowski)	(Moszkowski)	(Annandale & Robinson)	(Kloss)
Stature	170	161.85	159.6	157.3	162.3	154.74	151.88	152.42	151.95
Head length	189 (−192)	188.5	187.1	179.5	180.2	183.26	170.38	184.08	182.4
Head breadth	138 (−142)	138.1	141.1	147.5	147.8	138.60	143.54	142.92	142.7
Minimum frontal diameter	105	100.8	100.8	....	....	....	....	....	....
Bizygomatic diameter	140	135.9	134.4	139.9	136.5	126.51	119.08	135.10	134.4
Bigonial diameter	105	101.3	100.6	....	....	....	....	....	....
Face height	113	112.0	115.6	105.8	112.35	....	....	104.40	108.4
Nose height	49	49.8	51.7	....	....	....	....	40.59	44.6
Nose breadth	47	40.0	39.8	....	39.8	....	....	40.69	40.3
Cephalic index	73	73.2	75.6	82.2	82.1	75.68	84.32	77.72	78.5
Facial index	81	82.5	86.0	75.7	82.4	....	....	78.53	81.7
Nasal index	98	80.6	77.2	(100.2)[1]	(85.9)[1]	....	....	98.48	90.2

[1] Calculated by Sarasin from measurements on photographs.

Malay) type as an entity. Sarasin does not find enough difference between the Malays and the Indonesians to separate them, minimizing the discrepancy in the cephalic index; he concludes that the Malay is only a mixed strain of the Ur-Malay. Haddon, on the other hand, finds not one but two distinct proto-Malay forms. On the whole, however, the division of the Indonesian from the Malay has satisfied most workers.

The fourth element, of which the authenticity is likewise strongly debated, is the Vedda-like, or "pre-Dravidian" strain. The type has been sponsored principally by Sarasin and Kleiweg de Zwaan. According to these, it comprises specifically the Toala of Celebes and the Sakai (Senoi) of the Malay Peninsula (and Sumatra?), taking in as well the Vedda of Ceylon. Kleiweg de Zwaan believes that it crops out occasionally in the Menangkabau Malay and the Nias islanders; Ten Kate [1] claimed that it is present in the composition of the Battak and Dayaks, in the Lesser Sunda Islands and Mentawei; Moszkowski asserted that it was apparent in the Orang Kubu of Sumatra and in the Geelvink Bay region of New Guinea. Finally, it has been generally suggested that the Australians were members of, or allied to, this variety.

The characters of the type are fairly short stature, dark skin, and wavy hair. Other features are somewhat inconsistent. That the discussion centers around the hair form is obvious in all works on the subject. Martin found that the Sakai differed from the Semang in this feature alone, and concluded that they could not be intimately allied with the Vedda, but might be distant relatives of the Dravidians. The anthropometric evidence bearing on these "Veddoid" peoples will be inspected subsequently.

Besides the four types described, there is to be found a strong dark-skinned element in the eastern buffer territory between Indonesia and Melanesia, which comprises the Moluccas and the Lesser Sunda Islands. This has been commonly accepted as Melanesian or "Papuan" in origin, but it will be well to inquire where there has been an Australian contribution of any nature. In the Moluccas there is no reason to suppose that it is Negrito, since the gradation into the Melanesian native is continuous, through those islands nearest to New Guinea. These people will be treated first in the following detailed comparisons.

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[1] See Kleiweg de Zwaan, 1925.

Moluccas. This group of islands affords no figures for comparison with Australians. The so-called Alfuru, the wild tribes of the interior of Ceram and some of the other islands, present common instances of dark skin and frizzly hair, which in all probability is the outcome of the admixture of some Melanesian strain to a fundamentally Indonesian type. If there is anything about this population which would shed light on the Australian question, it cannot be shown at present.

Lesser Sunda Islands. Considerable material was obtained for a number of groups in Flores, Timor, and Sumba by Bijlmer, more or less recapitulating the less fulsome results of Ten Kate. From the numerous photographs of individuals which Bijlmer publishes, such a welter of contrasting types appears that one is not surprised that he reached no finite conclusions. "One had better not speak of Papuans in Flores and Timor, and certainly not of Negritoes . . . there is only a strong admixture of spiral-hairiness, and Mongoloid marks are nowhere entirely lacking."[1] Even these statements are questionable, for not a few photographs betray no "Mongoloid marks" whatever, but convince the beholder that he is looking at a Melanesian, Dravidian, Vedda, Australian, or a slightly modified Negrito. Bijlmer himself remarks upon the frequency of Australoid types. However, so marked is the influence of frizzly and woolly hair that the predominating black-skinned influence seems necessarily to be of a Melanesian type.

Aside from other differences between his various groups, Bijlmer concludes that there are two separate "Negroid" strains entering into the population as a whole, a dolichocephalic and a brachycephalic. But what these strains might be is not determined. There does not seem to be an Australian element of any size. The present author used Bijlmer's figures for Manggerai (the sample with the greatest range) correlating the cephalic and nasal indices. The coefficient of correlation is .065, revealing no association between a broad nose and a long head, an association which might be expected if there were a strong Australoid element mixed with a round-headed, narrow-nosed Malay strain.

The Kroenese of eastern Flores most nearly resemble the Australians in a metrical sense, although one gathers the impression that individuals of an Australoid appearance are commoner among the Beloenese. As for the nasal index, which is lower here than among more Mongoloid peoples of Indonesia, there is possibly a slight error in technique, placing the nasion too high. There is no direct check; Ten Kate's "longueur du nez" for the same people was a little less. In any event, there is no gradation among the several groups from a Negroid to a Malayoid type. Furthermore, there is nothing in the figures to indicate that the dark element in these hybrids is Australian rather than some sort of Melanesian.

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[1] Bijlmer, 1929, p. 189.

For want of better material, the only evidence of an Australoid element in these islands is photographic. Yet this evidence is very convincing, for the present author has never seen such pronounced Australoid types in photographs from New Guinea and Melanesia, excepting New Caledonia. Nor is it probable that within a few generations Australian blacks have by some accident reached these interior regions. The existing geographical and anthropological conditions suggest that the whole Lesser Sunda chain has the nature of a racial fish-trap, retaining specimen groups of several types which have invaded Indonesia as a whole, without providing asylum for their continued existence in isolation, and so forcing an amalgam.

Celebes. Sarasin [1] has distinguished three layers of population in Celebes. The Toala, the supposed aborigines, and thus named by Sarasin, are scattered thinly throughout the interior of the island. These are short, with a large proportion of strongly wavy or curly hair. The Toradja stratum, which includes the Bugi and Macassar, comprises the main body of the population. The Minahassa, of the northeast peninsula, are apparently a fairly recent intrusion. Sarasin considers the Toala and Toradja to constitute entirely separate immigrations and believes that the Toala (together with the Sakai of the Malay States) are akin to the Vedda, while the Toradja belong to the pre-Malay stratum of Indonesia. If the Toala are connected with the Vedda, then it is necessary, as will become apparent later, to compare them also to the Australians.

The author has lumped together all Sarasin's Toala in order to get a larger sample, which also seems to be more representative. Photographs of these people do not recall Australians, but in certain respects their measurements are alike. The nose is probably strongly platyrrhine, and the face is relatively broad and short. Here, however, all likeness ceases. Only the hair form suggests any affinity. The Toala are brachycephalic; they are also shorter than the Australians and apparently smaller in every way. Finally, most of the Australian facial characteristics are quite lacking.

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[1] Sarasin, 1906.

Sarasin found difficulty in reconciling the brachycephaly of the Toala with the dolichocephaly of the Vedda, as well as a marked difference in body proportions. However, he minimized the importance of the cephalic index and grouped the two together anyhow. The likeness between the Toala and the Sakai is more convincing, as will be pointed out.

There is no reason for considering the possibility that the Toradja and Australians are allied. However, it should be mentioned that Kleiweg de Zwaan, with some justice, does not regard the Toala as definitely separable physically from the Toradja. The latter seem merely to exhibit a stronger, if somewhat irregular, Mongoloid influence. This has been most marked in the Bugi and Macassar, for whom figures are quoted; other groups of Toradja given by Sarasin are considerably more like the Toala in the dimensions of the nose and face, as well as stature. They are not quoted here because the numbers are small.[1]

Borneo. From the island of Borneo no Negrito-like types have ever been reported, nor are any claims made for a Veddoid group as such. In the generally accepted scheme for Indonesia, the people of Borneo would fall mostly into the "Indonesian" division, although among such groups as the Kayan and Klemantan Mongoloid characters are strongly marked. Haddon proposed two subtypes, since there is a small minority of dolichocephalic groups;[2] aside from dolichocephaly, however, these last exhibit no Australoid characteristics. The best series from Borneo is one of 108 Kenya men.[3] These are low mesocephals with comparatively long heads, and a nasal index of about 82.[4] In spite of problems peculiar to Borneo, however, there is no apparent reason to suspect Australian elements in any known group.

[1] For several small series (few measurements) see also Lubbers, 1893.

[2] Haddon, 1901, 1912.

[3] Balner and Lebzelter, 1935.

[4] In the long list of groups for which Haddon gives a few data, the nasal index is very high, being over 90 or close to 100 in most cases. That there is involved a constant personal error on the part of the original observer is made probable by two facts: subjects illustrated in photographs do not look extremely platyrrhine, and nasal indices of Bornean groups given by other writers range from 80 to 85.

Philippine Islands. According to the writers[1] who have given the problem their attention, the population of the Philippines resolves itself easily into three types: the Negrito, which is most numerous in Luzon; the Indonesian (Pagan) element, comprising such people as the Nabaloi, Bontok, etcetera, of the hill country of most islands; and the Malay element (Tagalog, Bisaya, etcetera) which dominates the coastal regions of the group. Nowhere is there mention, or evidence, of an Australoid or Veddoid type. The Pagan tribes tend towards lower cephalic indices and extreme platyrrhiny (85–100); in this and in general physiognomy they resemble tribes in Borneo. Furthermore, the high nasal index is vouched for by several authors.[2] However, reference to a few of the other physical characteristics of these people again demonstrates that a high nasal index does not necessarily indicate relationship with the Australians.

Consideration of the Negritos is hardly necessary, though it may be said that they are here found with all their typical features in full bloom: short stature (147 centimeters), a black skin, woolly hair, brachycephaly, and marked platyrrhiny.

Java. Although decisive opinions have not been broached as to the composition of the Javanese, the material[3] which has been collected shows them to be fairly homogeneous physically, characterized by a cephalic index of about 85 and a nasal index of the same figure. According to Nyessen, the Priangan mountaineers of western Java have a low nasal index (*circa* 72), but this may be due to an error in his technique, which is not described. Nyessen also offers a classification of the Javanese, based on his own impressions, in which one type is "Dravido-Australoid" and another is reminiscent of the Semang and the Bushmen; but it is impossible to tell from his paper whether the scheme has any value. All other writers expressly deny the existence of a Negrito stock, and make no mention of Australian or Vedda-like types. The Kalangs and the Tenggerese of eastern Java are generally considered to represent the pre-Malay or Indonesian stratum in Java. No precise data are available on the form, but Kohlbrugge[4] has reported on the Tenggerese. These are mesocephalic, with a given nasal index of 100;

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[1] See principally Sullivan, 1918.

[2] See Sullivan, 1918.

[3] Nyessen, 1929; for various small or medium series from Java, Sumatra and Borneo, see Hagen, 1890; Garrett, 1912.

[4] Kohlbrugge, 1898.

from these and other characters they seem to be of the same type as the Indonesian tribes of Borneo and the Philippines, already described.

Sumatra. Besides the true Malays as represented by the Menangkabau Malay [1] and characterized by a long face and relatively narrow nose, other elements in the population include such peoples as the Battak, the Orang Kubu, and the Sakai. Dixon was inclined to group these together, remarking on their resemblance to the Sakai of the Malay States, and suggesting that they contained a submerged Negrito element. Hagen, however, allies the Battak to the pre-Malay stratum, and assigns a mixed origin to the Kubu [2] (small brachycephals and large dolichocephals) though in the last instance the data are too few to render the analysis conclusive. As for the Sakai of Siak, and the neighboring Akett, material has been furnished by Moszkowski.[3] He believes the Sakai to be identical racially with the Sakai of the Malay Peninsula, and with the Vedda. The Siak Sakai are short and dolichocephalic, while the Akett are shorter still and brachycephalic; both have wavy and curly hair. The spontaneous explanation for the Akett is that they are of Negrito stock, but the absence of black skin and woolly hair is a deterrent to its acceptance, while it also appears that there is a Mongoloid influence in the facial characters of both the Sakai and Akett.

Malay Peninsula. Here are found two groups to which attaches considerable interest: these are the Semang and the Sakai. The Semang are generally grouped with the other Negritos of Indonesia, those of the Philippines and the Andamans. They are short, though not extremely so; they have also a very dark skin, woolly hair, and a platyrrhine nose, as well as the characteristically very short face. In one respect they differ from the other Negritos: the cephalic index is four or five points lower, placing them at the border of dolichocephaly. Concerning the nose it should be remarked that Martin obtained an average index of 83.5 for four individuals, while Skeat and Blagden give 101 for five. In spite of Martin's reputation as a technician, there is probably more justice in accepting the higher figures. The reason for raising the question at all is that if Martin's meager data are accepted, the Semang would appear as slightly taller and less platyrrhine than the Sakai, which is not in agreement with what other workers have found.

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[1] Kleiweg de Zwaan, 1914: a large series.

[2] See also Volz, 1909, for series of 9.

[3] Moszkowski, 1908.

General opinion, following Martin's lead, has constituted the Sakai as a separate racial element from the Semang. The Sakai exhibit wavy or curly rather than woolly hair; they may or may not be slightly taller, and they have somewhat longer faces and a lower average nasal index.[1] The cephalic index varies among different groups from 76 to 80, but in general appears to correspond with that of the Semang.

Virchow and Sarasin, as well as numerous others, have contributed to one general theory in linking the Sakai to the Vedda of Ceylon and thus to the hypothetical pre-Dravidian or Dravido-Australian race group, which differs slightly in conception from one author to another. Martin, however, preferred to be non-committal on the point. Furthermore, Martin, in spite of his separation of the Semang from the Sakai, stated that no definitive differences could be established between them outside of the hair form. And it seems probable from a number of the published photographs that woolly hair is not universal among the Semang, nor is woolly or nearly woolly hair unknown among the Sakai. At any rate, the question of the Sakai is an important one in this discussion of the Australians.

Little orderly arrangement has been found among the remaining peoples of the Peninsula. Martin groups them together but designates them as a "Rassenaggregat." In general the nasal index is mesorrhine, standing at 80 or below; some have straight or slightly wavy hair, with a cephalic index which approaches dolichocephaly, while others are more purely straight-haired with a definitely brachycephalic index. This indicates that in the Malay States there are the same two strains, the Indonesian and the true Malay, which have been described in the several islands.

Summary of Indonesia. Nothing very much like the Australian black has been found in this area. The closest approach is probably to be found in individual types among the heterogeneous population of Timor and Flores. The next which suggests itself consists of the supposedly connected Toala and Sakai; here the best argument for such a view lies in the wavy hair. These two groups are believed by many to be allied with the Vedda, who in turn are believed to be related to the Australians. There is no apparent reason for attempting to connect the Negrito, Indonesian, or Malay groups with the Australians.

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[1] Kloss, 1915, arrived at his figures by combining his material with that of Annandale and Robinson, which gave almost identical means throughout. Both series are Sakai of Perak.

The "Pre-Dravidians." Before further considering the probability that the "pre-Dravidian" element in Indonesia is related to the passage of the Australians through this territory, let us attempt to resolve the pre-Dravidian element itself. As it is constituted (by Sarasin, Kleiweg de Zwaan, and others), it comprises Vedda, the Sakai, and the Toala. To begin with, there is no great resemblance in head measurements and stature between the Vedda and the other two (the Vedda resemble the Semang equally well); on the contrary, the Vedda are a purely dolichocephalic strain. The hair form is of course similar, but the facial resemblance so often mentioned is seen from a large number of photographs of Sakai and Toala[1] to be largely imaginary, while Negrito characteristics, particularly in the Sakai, are pronounced.

Table 34. GROUPS RELATING TO THE "PRE-DRAVIDIANS"

	Vedda	Semang	Sakai	Nias
Number	8	13	78	C. 1295
Author	(Deschamps)	(Annandale & Robinson)	(Kloss)	(Kleiweg de Zwaan)
Stature	157.5	152.42	151.95	154.73
Head length	189.62	184.08	182.4	181.0
Head breadth	137.12	142.92	142.7	146.1
Bizygomatic diameter	(c.134?)	135.10	134.4	138.0
Face height	105.75	104.40	108.4	112.8
Nose height	46.07	40.59	44.6	49.3
Nose breadth	38.78	40.69	40.3	38.1
Cephalic index	72.31	77.72	78.5	80.72
Facial index	..	78.53	81.7	81.74
Nasal index	84.18	98.48	90.2	77.28

The alternative theory as to the origin of the Sakai is therefore that they have been produced by an ancient admixture of the Indonesian or proto-Malay strain with the indigenous Semang.[2] The slight differences in measurements between the Sakai and the

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[1] Martin and Sarasin.

[2] This is Dixon's suggestion. He considers that the Semang themselves were formed by the adding of a Negroid-Australoid strain to a pure Negrito, as exemplified by the Andamanese.

Semang should be considered in the light of the measurements given in the table of the people of the island of Nias, who are good representatives of the Indonesian type. In this way the longer face and lower nasal index of the Sakai are easily explained, to say nothing of the hair form. All too little is known of the behavior of hair form in racial crossing, but it seems that the spiral hair of the Negro or Negrito when crossed with straight or wavy hair of the European type produces curly or wavy hair, which, however, retains somewhat of a crimped or frizzled quality. The hair of such a Mongoloid strain as the Indonesians, even though slightly wavy, might impart a somewhat smoother character to the hair of such a mixture as has been suggested, but this is only speculation.

This explanation seems to have no serious drawbacks, and conforms to the principle of conservation in the number of ultimate racial types postulated, since it is thus unnecessary to regard the Sakai as a separate group originally. The corollary is, of course, that the Toala represent an original Negrito stratum in Celebes which has been overwhelmed by the Indonesian Toradja.

One more fact should be noted: osteological material from the Malay Peninsula,[1] which is apparently fairly old, reveals people some of whom are short and some medium, but all very dolichocephalic, whose crania are said to resemble those of Australians and Vedda.

Asia. We temporarily continue on the hypothesis that Australia was not the scene of the evolution of the native type, but that the population came by way of Indonesia from the Asiatic continent. We ignore for the moment suggestions as to the Australoid affinities of the Moi of Indo-China or the Ainu of Japan, and pass at once to consideration of the more primitive peoples of India and the Vedda of Ceylon.

India. Until recently the best existing survey of physical types in India was Dixon's treatment in his "Racial History." The people of India are predominantly dolichocephalic throughout (except on the west coast). Proceeding from the northwest to the east and south, the stature tends to diminish, the hair to curl, the skin to darken, and the nose to flare. This train of change culminates in the Dravidians and the wild jungle tribes. The "Dravidians" constitute a language family which covers the southeastern portion of India, and comprises a variety of tribes and types, from these same jungle tribes to the pastoral Toda of the Nilgiri Hills.

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[1] Duckworth, 1934.

Table 35. AUSTRALIANS COMPARED WITH PEOPLES OF INDIA

		Southern India			Chota Nagpur		Bengal
	Australians	Toda	Polyan	Kurumbar (Mullu)	Oraon	Munda	Malé
Author		(Thurston)	(Fawcett)	(Fawcett)	(Risley)	(Risley)	(Risley)
Number		25	25	25	100	100	100
Stature	170	169.6	150.6	161.1	162.1	158.9	157.7
Sitting height	82	87.9	..	..	..	..	..
Biacromial diam.	35	39.3	36.6	38.3	..	..	..
Head length	189(–192)	194	188	193	184.6	185.9	183.6
Head breadth	138(–142)	142	137	136	139.3	138.6	137.5
Head height	126	130	..	..	127.2	129.2	126.3
Min. frontal diam.	105	..	..	..	101.9	101.5	100.5
Bizygomatic diam.	140	127	130	128	130.4	130.7	131.4
Bigonial diameter	105	96	103	103	..	..	..
Nose height	49	47	40	42	46.2	44.7	43.9
Nose breadth	47	36	38	36	39.8	40.2	41.5
Relative sitting ht.	49	51.83[1]	..	..	..	..	..
Relative shoulder breadth	21	23.17[1]	..	23.77*	..	..	..
Cephalic index	73	73.3	73.4	70.3	75.4	74.5	74.8
Fronto-parietal ind.	76	..	..	..	73.15*	73.23*	..
Cephalo-facial ind.	95	89.44[1]	..	94.12*	93.61*	94.30*	..
Zygo-frontal index	75	..	..	..	78.1	77.6	76.4
Zygo-gonial index	75	75.7	79.5	80.4	..	..	..
Nasal index	98	74.9	94.1	86.9	86.1	89.9	94.5

* Calculated from the means.

"The affinities of the Australians, more or less, with the 'Dravidians' is now generally accepted," wrote Haddon,[1] and this acceptance has so far been based upon external characteristics, or the fact that both groups possess dark skins, wavy hair and general hairiness, and heavy brows and wide nostrils. Furthermore, the sporadic presence of the boomerang in India and supposed points of resemblance between the Dravidian and Australian languages are two bits of evidence which have been used by several authors to bolster up the argument from the ethnographical side. The theory of the connection, with its history and contributors, is well set forth by Thurston [2] in the introduction to his "Castes and tribes of Southern India." Notwithstanding, nobody appears to have made a direct comparison of measurements, probably because of the paucity of data on Australians.

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[1] Haddon, 1899, p. 433.

[2] Thurston, 1909.

The latest contribution to the anthropology of India is a considerable one: that of Guha in the Census of India.[1] The author uses the Coefficient of Racial Likeness to orient a great many different groups, for most of which he obtained the material himself. Unfortunately for the present study, he presents almost no material on the jungle tribes and the Dravidians, but uses other sources in his comparisons.

Besides three principal modern strains, Guha finds two different elements remaining from the aboriginal population.[2] The first is short and dolichocephalic with a short, broad face, and a small, flat, wide nose, and with wavy or curly hair and a skin of a dark chocolate brown, approaching black. He finds the type "predominant among the aboriginal tribes of Central and Southern India," and believes it to be allied to the Vedda, the Toala, and the Sakai. He also believes the Australians to represent the type in a more primitive form. Its best examples are the Bhils of the Vindhya and the Chenchus of the Farhabad Hills.

The second type is a "dark pygmy strain having spirally curved hair, remnants of which are still found among the Kadars and the Pulayans of the Peramabicullan Hills."

As to the wild jungle tribes, it now seems clear that they derive in part from a Negrito base, corresponding to the type defined by Guha. This theory, as Guha says,[3] was formerly unpopular among anthropologists, since woolly hair was apparently unknown. Guha, however, describes and illustrates individuals of the Kadar tribe with strongly woolly or frizzly hair, and quotes reports that in this tribe such hair used to be very common. Superficially regarded, the wild tribes resemble the Semang (and the Sakai) of the Malay Peninsula in physiognomy, rather than the Australians. They are, in the main, black-skinned and dwarfish, with very broad noses and a tendency toward strongly curled hair.[4] Thurston lists the means of a few measurements and indices for 74 south Indian groups, of which 11 are jungle tribes. Among the latter the nasal index ranges from 80.1 to 95.1, while for the remaining 63 samples the range is from 71.1 to 81.5. The stature of the jungle people is lower than that of the other groups, running from 150.5 to 162.5 centimeters. For specific examples may be taken the Paniyan and Kadir tribes, which are more fully described and illustrated by Thurston in another work.[1] The one fact which weighs most strongly against the belief that the jungle people are of Negritoid origin (though not so much against a Semang or Sakai connection) is their general dolichocephaly. A group of Polayans of Malabar, given in Table 35, is representative of these forest tribes. They are short and very dark and have strongly waved and curly hair. Their cephalic and nasal indices are comparable to those of the Australians, but in absolute dimensions they are much smaller.

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[1] Guha, 1935. "Census of India, 1931: Racial Affinities of the Peoples of India." Another recent approach to the problem is a paper by von Eickstedt, 1934: "The position of Mysore in India's racial history." As his classification is a subjective one, which he does not attempt to demonstrate by means of anthropometric data, its validity cannot be assessed, nor does it aid in the present study.

[2] See Guha, 1935, pp. lxii and lxiii.

[3] Guha, 1935, p. l.

[4] Thurston, 1909.

We may next examine other Dravidian-speaking groups as a hunting ground for Australoid elements, probably of the first type described by Guha. The means of several tribes are given in Table 35. The Toda inhabit the Nilgiri Hills along with such other pastoral and agricultural people as the Kota, the Bagada, and the Irula.[2] The Toda are the tallest of the region, and the hairiest, with well developed brow-ridges; they are also, together with the Bagada, relatively light-skinned. As Table 35 indicates, they are the only Dravidian people who compare with the Australians in size.

The general hairiness of the Toda, together with the fact that their hair is less curly than that of other Dravidians, has led a few writers (e.g. Howitt[3]) to believe that they represent a dark-skinned stock which might have contributed these characters of the hair to the Australians. However, the Toda are lighter-skinned than other Dravidians, as well as taller, facts from which Dixon and others conclude that they themselves are remnants of the original Aryan invasion from the west who have maintained themselves against mixture better than their neighbors, which would place their advent too late to be concerned in the hypothetical formation of the Australians. The Irula, like the Kurumbar of the Malabar coast, are dark-skinned and of an Australoid physiognomy. The Kurumbar are seen to have a much higher nasal index than the people of the Nilgiri Hills (excepting the Irula), approaching that of the jungle tribes, with whom they are traditionally connected. In Chota Nagpur there live a number of tribes with Australoid physical characteristics, though they do not have these to the same degree as the people of Southern India. Principal among these are the Oraons, an important Dravidian-speaking group. These are said by tradition formerly to have been one tribe with the Malé and Mal Paharia,[1] and to have entered Chota Nagpur from the west, pushing the Munda, who occupied the plateau, ahead of them. The Munda speech is a family entirely separate from the Dravidian, and said by Schmidt to belong with Mon Khmer, Sakai, and Semang. However this may be, it is readily seen from the measurements that the present physical affinities of the Oraons are with the Munda, and not with the Malé. If the Oraon once belonged with the Malé, something has modified the nose and stature of one of them. The Malé appear to resemble the jungle tribes of the south more than any other group.

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[1] Thurston, 1897.

[2] See Fawcett, 1900; Schmidt, 1910.

[3] Howitt, 1904.

Table 36. AUSTRALIANS COMPARED WITH CHENCHUS OF FARHABAD HILLS, INDIA

	Australians	Chenchus
Author		(Guha)
Number		23
Stature	170	164.95
Head length	189(–192)	185.17
Head breadth	138(–142)	134.83
Minimum frontal diameter	105	100.83
Bizygomatic diameter	140	129.00
Bigonial diameter	105	93.39
Total face height	113	110.00
Upper face height	65	61.35
Nose height	49	48.22
Nose breadth	47	38.98
Cephalic index	73	72.89
Fronto-parietal index	76	74.85
Cephalo-facial index	95	95.75
Facial index	81	85.26
Upper facial index	46	47.56
Nasal index	98	81.38

The Chenchus (see Table 36) are a group which Guha considers best portrays the aboriginal Veddoid, or non-pygmy, element in India, already referred to. The one individual of this tribe whose photograph is published by Guha looks extraordinarily like an Australian. He describes them[2] as having skin ranging in color from tawny brown to dark chocolate brown, and hair which is generally black and in most cases wavy, with small proportions being straight or curly. Supra-orbital ridges are well marked. The measurements show that the group is smaller than Australians in all dimensions of the head, particularly in the facial breadth, but that in the indices there is a fairly strong resemblance.

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[1] See Roy, S. C., 1915.

[2] Guha, 1935, p. xlv ii.

As to the question, therefore, of Australian-like peoples in India, we see that the measurements are on the whole not encouraging. A degree of dolichocephaly prevails among the Dravidians similar to that in Australia, and the head is of much the same size. The nose, while sometimes very platyrrhine, is variable and on the whole much smaller than in Australia. A serious difficulty in the comparison is the narrow face in the Indian groups, while almost no data exist for the facial height.

Ceylon. The Vedda of Ceylon present a much better likeness to the Australian natives than do any of the Indian tribes, and this strong likeness has been mentioned by a horde of writers. Briefly put, the Vedda seem like a less extreme form of the Australian. The hair is wavy or curly, but the general body or facial hairiness is less than in Australia. The brow-ridges are prominent and the nasal root depressed, but the nose is not so broad or heavy, nor is the jaw so prognathous [1] as in the Australians.

The measurements of the Vedda (of which few are available) correspond closely with those of Australians. The only essential differences are the lower stature and the smaller, less platyrrhine nose of the former. As to the face, the bizygomatic diameter given by the Sarasins is doubtless more nearly correct than Deschamps's,[2] which is unreasonably low. Allowing this assumption, the faces of the Vedda are thus somewhat smaller than the Australians, but still the bizygomatic breadth is greater than that of other Indian peoples. (The Singhalese are introduced simply as a contrast to the aboriginal Vedda.)

It seems pertinent to quote here, without interpretation, from Dixon,[3] whose segregation of the Vedda into his own types gives evidence of another sort of their pronounced affinity with the Australians, compared to South Indian groups: "In head-form analysis of the data shows a very large majority of dolichocephalic forms, the Proto-Australoid and Proto-Negroid being present in nearly equal proportions, the Caspian type being present as a small minority, while of brachycephalic factors there is hardly a trace. The Vedda thus are comparable with the Tamil population of southern India (Dravidians), with the brachycephalic factors left out, and the Proto-Negroid element much weakened." This indicates a distribution similar to the balance between the Proto-Australoid and Proto-Negroid types in Australia itself.

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[1] See Seligmann, 1911.

[2] See Table 35.

[3] Dixon, 1923, p. 264.

TABLE 37. AUSTRALIANS COMPARED WITH VEDDA OF CEYLON

	Australians	Ceylon			
		Vedda (coast)	Vedda (central)	Vedda	Singhalese
Author		(Sarasin)	(Sarasin)	(Deschamps)	(Deschamps)
Number		11	14	8	14
Stature	170	158.8	156.7	157.5	160.51
Sitting height	82	..	..	72.9	77.96
Biacromial diameter	35	..	..	..	35.17
Head length	189(–192)	..	..	189.62	182.71
Head breadth	138(–142)	..	..	137.12	138.78
Minimum frontal diameter	105	..	..	104.25	94.64
Bizygomatic diameter	140	136.4	132.3	120.87	..
Bigonial diameter	105	..	..	105.75	..
Total face height	113	111	105.1	..	..
Nose height	49	..	..	46.07	47.39
Nose breadth	47	40.8	39.4	38.78	35.64
Relative sitting height	49	..	..	46.30	48.60
Relative shoulder breadth	21	..	..	..	21.96[1]
Cephalic index	73	..	..	72.31	75.95
Fronto-parietal index	76	..	..	76.03[1]	68.19[1]
Nasal index	98	..	..	84.18	75.20

[1] Calculated from the means.

It has already been pointed out how frequently parallels have been drawn between the Vedda and the Sakai of Malacca. Outside of the hair form, the grounds for these parallels have been almost entirely impressions derived simply from ocular inspection of these people or of their photographs. One might answer these assertions by retorting that their crania do *not* look much alike. Discrepancies appear between the two groups when one compares measurements of the living Vedda with those of the Sakai, given in Table 34. The Vedda are short, but not so dwarfish as the others, and the difference in head dimensions and index is serious, since a difference of five units in the cephalic index is more considerable than a similar difference in the nasal index. It might be said that the two groups have been each changed from an original common form, by infiltration on one hand from a dolichocephalic, on the other from a brachycephalic stock. However, it is reasonable to demand more than a likeness in hair form in support of this idea. As matters stand, the Sakai metrically resemble their neighbors the Semang far more than they do the Vedda or the Australians.

Indo-China. The Moi, the wild people of the hills of Indo-China, have been included by some in the postulated pre-Dravidian type, thus linking them with the Sakai and the Vedda, and by implication with the Australians. It is said that among the more remote of these, curly hair, black skins and broad noses are to be found. However, most of them do not display such features, though the data are very poor. They are short of stature and mesocephalic.[1]

Ainu. A last Asiatic group which has more than once been mentioned in connection with the Australians is the Ainu of Japan (see Table 36). Both have abundant hair on head, face and body, that on the head being wavy or curly; the Ainus also have a fairly strong development of the brow-ridges. It has been suggested that the Australians derived their hair form from some primitive "Caucasoid" strain in Asia, a hypothesis which the Ainu seem to satisfy.

TABLE 38. AUSTRALIANS COMPARED WITH AINU

	Australians	Ainu	Ainu	Japanese
Author		(Montandon)	(Koganei)	(Montandon)
Number		55	91	33
Stature	170	159.5	156.7	158.1
Head length	189(–192)	198.3	193.7	185.5
Head breadth	138(–142)	149.5	149.7	150.8
Bizygomatic diameter	140	142.4	143.8	140.0
Face height	113	118.2	124.9	119.2
Nose height	49	47.6	55.4	50.4
Nose breadth	47	39.3	..	36.7
Cephalic index	73	75.5	77.3	81.3
Cephalo-facial index	95	95.3*	96.1*	92.8*
Facial index	81	83.0	86.9	85.4
Nasal index	98	83.4	..	73.3

* Calculated from the means.

The head measurements of the Ainu reveal no particular likeness to the Australians, and they are considerably shorter, but there are certain interesting facts. The purer Ainu are largely dolichocephalic, contrasting with almost all their neighbors, and the nasal index is relatively high. However, any hypothesis linking the two peoples on the basis of known facts must be too tenuous to be introduced here, and will therefore be postponed for later discussion.

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[1] Holbe, 1923.

Summary of Asia. In Asia, approaches to an Australoid form of man are limited to India, and are most pronounced in the Vedda of Ceylon, these being the only people whose metrical characters show any general correspondence with those of the Australians. In India itself the indications of a deeply submerged Australoid element are found in the character of the hair (which might be explained on other grounds) and the sporadic occurrence of such features as well marked brow-ridges; however, the more primitive (and platyrrhine) peoples seem rather to suggest an ancient Negrito strain.

The Dravidians. The term Dravidian is used to denote the darker peoples of southern and eastern India, and is also applied to the language group which covers most of this area, distinct from the encroaching Indo-European tongues of the northwest. The language group, however, does not include the Munda or the Vedda. Probably, then, the aboriginal black-skinned people were not Dravidian-speaking, or else not racially homogeneous, or neither.

As to the Dravidians proper, Hooton's [1] suggestion is that they arose from an Australoid (or partly Negroid) strain compounded with a White strain, probably of the far-flung Mediterranean type, and not the Aryans of proto-historic times. This is presumably as nearly correct as any theory regarding the question, but the problem of the aboriginals is left unsolved. These in all likelihood consisted of Australoids, Negritos and perhaps Negroids in India, but only of Australoids in Ceylon. Only the Vedda show consistent Australian affinities, yet, tenuous though the evidence is, it is difficult not to believe in an Australoid element for the Dravidians. On the other hand, the Vedda cannot be linked with the Negritos, due to their dolichocephaly; however, the forest tribes in southern India, with their short stature, very curly hair, and facial features, can only be satisfactorily explained by the assumption of a former Negrito population.

DISCUSSION OF THE AUSTRALIAN RACE

Theories. Prester John and the Ten Lost Tribes have hardly given rise to opinions more multifarious and romantic than has disputation over the ultimate origin of the Australians. And small wonder, for, as we have said, they are peculiar people, aberrant from the three major race groups, and confined to one corner of the earth. Their flowing wavy hair has always been the chief actual cause for argument, but equally arresting facts are the above-mentioned isolation and their undeniably primitive morphology. It is to be hoped that the reader of the ensuing essay will bear in mind that much of what sounds like assertion is only suggestion. Let us first list and briefly discuss some of the theories which have been offered, classified according to the principal idea behind each.

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[1] Hooton, 1931, p. 556.

I. Australia represents the home of mankind.
II. The Australians are descended from Neanderthal man.
III. They are the living representatives of an early Homo sapiens stage.
IV. They are the product of mixture between:
  (a) a "White" and a Negrito or Negro stock,
  (b) two differing Negroid strains,
  (c) Tasmanian and Polynesian.

I. The notion that Australia represents the original breeding ground of Homo sapiens, and that only the Australian clung to both his home and his somatic heritage, while the progenitors of other races changed color and wandered away, generally involves the belief in a lost continent. Basedow,[1] for example, suggests that man originated in Gondwanaland, which included South Africa, India and Australia. Migrating groups from the main stock became Whites, Negroes and Mongoloids. Then the land broke up, and the congenial climate of Australia impelled in the isolated Australians no evolutionary progress from their primitive state. However, the best authority indicates that Gondwanaland had disintegrated before the beginning of the Tertiary period. For the disappearing continent Schoetensack[2] substitutes the rising and falling of parts of the Indonesian land-bridge. Primitive man (and the dingo) came from Asia to Australia, where modern racial types began to bud from the common stock, escaping back to Asia when the land-bridge valve permitted it. But it is excessively difficult to see how a stock which has remained so conservative in Australia, and which is today so homogeneous and morphologically isolated,

[1] Basedow, 1925.

[2] Schoetensack, 1901.

could have been the fertile fountain-head from which sprang the diverse racial forms of today.

II. Aside from the opinions of those who, like Hrdlička, believe that Homo sapiens is derived directly from Homo neanderthalensis, the suggestion was formerly made (once by W. J. Sollas [1]) that the Australians alone were the descendants of the Neanderthalers. This thesis rests upon the brow-ridge development in particular and the unrefined facial aspect in general. However, it is more reasonable to suppose that if the Australians are of Neanderthal descent, so are other modern races, since the Australians share all those characteristics of Homo sapiens which are generally accepted as separating them from other species. Examples are (a) brow-ridges which are typically not true tori, but divisible into separate elements; (b) canine fossae; (c) a mental eminence. To which may be added the fact that the Australian vault, in spite of its length and lowness, is different in character from that of the Neanderthal in its keel, its plane surfaces and its lack of breadth. Remark also the Neanderthal specializations of bowed limbs and taurodont teeth, which to most students definitely remove the type from the antecedent line of modern man.

III. The belief that the Australian is a survivor, not of Neanderthal man, but of one of the early forms of modern man, is well expressed by Keith, its principal proponent: [2]

"In this continent (Australia) has come down to us, much changed by specialization of a superficial nature, mammals which are really living fossils, representatives of a very ancient stage in mammalian evolution. In the same way this continent has preserved for us a very ancient type of man. It is true the jaws of this ancient type have grown smaller in his descendants, but they have kept his essential characteristics. More than any other man, the aborigine of Australia and Tasmania seems to have conserved the qualities of the stock which gave rise to all modern breeds. We may look upon him as the best living representative of Pleistocene man."

This belief rests specifically on the Australoid Wadjak and Talgai skulls, which appear to be fairly ancient, particularly the latter. To Keith's mind the modern Australian has changed to a slight degree from the Talgai type, especially in the palate, but still remains essentially what he was upon his Pleistocene hejira.

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[1] Sollas, 1911. Von Luschan was an adherent of this theory, according to Hooton, who talked with him on the subject.

[2] Keith, 1925, p. 456.

It might be mentioned that this theory is more or less concurred in by Hrdlička,[1] although he more specifically relates the Australian to an archaic White stock of Europe, supposedly of a late Mousterian or Aurignacian age, which somehow managed to reach Australia.

IV. Almost all other types of theory regard the Australian not as a pure race but as a thorough blend of other strains, a process which may have taken place either on the mainland or in Australia. The general objections to such theories are two: first, the Australians are extremely homogeneous throughout the continent, in spite of former notions to the contrary; and second, there is no modern or "neanthropic" racial type which might be the parent of such backward beings.

(a) A hypothesis advanced principally by Hooton,[2] and also by Howitt [3] and Giglioli,[4] explains the Australian as the mixture of an aboriginal frizzly-haired Melanesian and a primitive Caucasoid strain. In each case the Melanesian is represented by the Tasmanian, whom Hooton takes to be the earliest Melanesian, and Howitt, following Turner, as a Negrito derivative. Hooton [2] says: "The reason for thinking that the Australians are fundamentally 'White' is that when we get into the central and southern part of the continent, the hair of the Australian is usually wavy rather than curly and never woolly or frizzly." Also light hair and eyes [5] have been reported. (This blondness of the hair, found particularly in children, might be considered expressive of a "White" ancestor; however, such an ancestor would himself have to be a true blond, a type which in the Caucasoid family is not generally believed to be archaic or fundamental. Other suggestions may be offered,[6] but the actual significance of the phenomenon must await full investigation.)

This theory has much to recommend it, though it rests primarily on that stumbling-block, the hair form. Hooton [7] believes that certain characters of the Ainu such as heavy brow-ridges and depressed nasal root, as well as hairiness, are at least symptomatic of the postulated White stock. On the whole, however, the cranial resemblances of the Ainu to the Australian are not perceptibly greater than those of common European types, the divergences of the Ainu from the latter being rather in a Mongoloid direction.

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[1] Hrdlička, 1926.
[2] Hooton, 1931, p. 552.
[3] Howitt, 1904.
[4] See Howitt, 1904, p. 4.
[5] The author has found only one case of light eyes, that described by Basedow (1925, p. 25).
[6] For particulars concerning blondism, see p. 38.
[7] Hooton, 1931, p. 539.

(b) The Australian has been extensively explained as an amalgam of two different Negroid groups, which are variously described. Topinard, as has already been set forth, and also Mathew, supposed that a tall straight-haired group had conquered and fused with a small, exceedingly inferior woolly-haired people much like the Tasmanians. As we have seen, the heterogeneity of type on which Topinard based his hypothesis had been much exaggerated. Dixon[1] held that Australia was first populated, together with much of the western Pacific, by an old wave of Australoid peoples carrying a substratum of the Negrito type. This lasted in a pure form only in Tasmania, the Australians being modified, especially in the north, by a later Negroid invasion. Two facts, however, are to be noted: the curliest hair occurs both in Tasmania and in the north, which are the regions supposedly most strongly contrasted in type; and from the manner in which Dixon's cranial types were constituted, the moderate difference in head height which actually exists affects his mathematical analysis very strongly.

(c) A suggestion of Sergi[2] derives our subjects from Polynesian seepage into Australia, then occupied by the Tasmanians, who are taken to be a pure, ancient and wide-spread Oceanic and American aborigine. The essential portion of the theory is not as futile as it seems, considering the dolichocephaly and beardedness of the early Polynesians. It is somewhat like the suggestion of Caucasoid admixture already presented. However, there is a general dissimilarity in cranial characters between Polynesians and Australians, and if physical grounds fail us, a cultural rebuttal will suffice.

The Australians an Early Form of Homo Sapiens. The theory to which we are led by the present body of evidence is more or less the one which Keith suggested. *The Australian is not a blend but a major race, and is the most archaic race still surviving.* He probably presents with considerable fidelity the morphological stage attained by Homo sapiens in Asia at that remote time when he wandered out into the Pacific and isolation. He may have undergone

[1] Dixon, 1923, p. 375.

[2] Sergi, 1913.

some minor changes, but he is intrinsically what he was when he left the evolutionary crucible on the Asiatic mainland which has since given off the specialized (superficially) Negroid and Mongoloid and the unspecialized White and American Indian.

The modern concept underlying the emergence of man is that of a progressive central stock of Primates which in Tertiary history has repeatedly divided, one division losing its upward momentum and tending to become highly adapted, the other remaining conservative in its adaptations, but retaining its potential adaptive powers to a high degree.[1] The specialized branch may have an interesting subsequent history and, according to the principle of orthogenesis, even parallel the evolution of the other for a certain distance. But in morphological development it ultimately falls far behind the more moderate branch, which is already throwing off specialized groups of a more advanced type. Thus the animal kingdom is overrun with forms which, although specialized in many ways, still represent a stage which was once the highest which their family or order had attained. The generalized stem, then, has pursued a fairly direct highway, avoiding seductive but confining byways of development, though at the same time passing within the borders of certain morphological "areas" which are now the provinces of those stocks which did follow a byway.

These conceptions, however, have only recently been applied to the Hominidae, which is the fault of the now completely discarded attempt to fit all fossil humanoid forms into the direct lineage of Homo sapiens. The lessons of Primate history make it seem probable that, instead of producing them more or less simultaneously, the human stock gave off the original forms of the several racial stocks as it progressed near to or actually through the types or stages which they represent. (It must always be remembered, of course, that these racial stocks have had independent histories of considerable duration.) Let us therefore examine the reasons for believing that, of the surviving races of man, the Australian is the oldest, and the Negro group, together with the Negrito, probably the second oldest.

Proceeding inductively, we may postulate some of the characters of the immediate and direct progenitor of Homo sapiens, from the collective evidence of fossil types and of the Primate family in general. This is not difficult. Our ancestor was probably long-headed, with a low forehead and larger brow-ridges than at present; he was likewise more prognathous, with a larger palate and teeth and a smaller chin. Of his external characters we must ignore the color of his skin and say of his nose only that the root was probably low and broad. His hair was probably plentiful on his body, and, most important of all, was probably slightly wavy. At any rate, it was certainly not woolly, and most probably was not lankly straight like that of the highest Malays and Chinese, for no Primate hair can be strictly compared with either of these forms.

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[1] For a treatment of Primate evolution see Le Gros Clark, 1934, "Early Forerunners of Man"; 1935, "Man's Place among the Primates." See also Montandon, 1928, "L'ologenèse Humaine."

Here, then, is a reasonable picture of the proto-modern human stock. It is merely redundant to point out how much nearer such a type the Australian stands than does any other race, or to remember how convenient an adjective the word "Australoid" has become to express a primitive morphology. Furthermore the explanation of the hair form in Australia becomes a simple matter: the wavy hair does not result from the modification of a woolly-haired black people by a straighter-haired group, but has been retained from an ancestral form existing before woolly hair had ever appeared.

Specializations peculiar to the Australians, away from the ancestral form, are rather harder to divine. They possibly include the development of the deep pigmentation, affecting even the sclera of the eye, though we have no fossil skin color to give us proper information. Other characters of this sort might be the bulbous nasal tip and the keel of the skull vault, though this is very doubtful. A final suggestion is that the short face is a special character, though it more probably represents a definite stage in facial evolution.

The direct evidence of the antiquity and persistence of the Australian type rests almost entirely on the Talgai skull, but partly also upon those from Cohuna, and from Wadjak in Java. Archaeological data are meager. Keith[1] considers the Wadjak crania, said to be of Pleistocene age by their discoverer Dubois, already to have outstripped the Australians in their development, judging by the cranial capacity, though in most respects they are Australoid in type. The skull from Talgai, Queensland, is Pleistocene, perhaps mid-Pleistocene. This too is definitely Australian in type, though Keith, from the shape and size of the palate, infers that it is rather more primitive still, and should be taken as the immediate prototype of the race. There has been much uncertainty, however, regarding the palate, due to the crushed state of the specimen. Hellman[1] has recently made a new and extremely careful restoration which removes the ape-like characters of the arch and presents a primitive generalized human form which recurs in a percentage of present-day Australians. As the arch had been the main point of difference between the Talgai man and the modern type, the fossil evidence becomes more amenable to the idea of the long existence of the Australians in Australia, undergoing relatively slight changes. As for the Cohuna skull, this appears to be of the same proto-Australoid type, and its remarkable prognathism and large teeth lead Keith to consider it as an extremely primitive type, and to infer that the Australians have traversed a long road of development in their own continent. But little information has been made available concerning the Cohuna skull, however, and the circumstances of its finding gave no direct evidence of great antiquity except for mineralization and morphology; it was revealed at a shallow depth, without accompanying artifacts or animal remains, and parts of other human skeletons found near it indicated that all these individuals had been buried.

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[1] See Keith, 1925–1931.

It may be well to extend the discussion to include the probability that the Negro was the next racial stem to undertake its independent development, since one might argue that instead of continuing on with the main stock after the Australian had parted from it, the Negro evolved directly from the Australian. Besides citing the black skin and prognathism common to both,[2] one might point out that Australoid-looking crania appear most frequently among the Negroes; however, such crania are certainly not unknown among Whites and American Indians, and seem merely to echo the one-time Australoid stage of Homo sapiens. And there are strong arguments favoring the opposite view. The Negro still has his prognathism, as have some types of American Indian, but in common with other races he seems to have lost the big brow-ridges and developed more of a forehead, which in many Negroes is actually bulging. And if the black skin and the prognathism are traits derived from Australian ancestry, then so might be the hairiness and the well-marked brow-ridges of the White stock.

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[1] Hellman, 1934.

[2] Other evidence of racial proximity of the Negroes to the Australians is to be found in the general correspondence in body and head measurements of the latter with those of African Negroes (West Africa).

The Negritos are probably the best evidence against the derivation of the Negroes directly from the Australians. They are obviously members of the Negro family who appeared only after most of the Negro specializations had been established. Their only definite difference from the Negro proper lies in their stature, since their tendency toward brachycephaly is frequently supposed to be a function of their shortness. Thus, while they in many ways represent a refinement or exaggeration of the Negro type, at the same time they contrast strikingly with the Australian, although they still retain the black skin and the prognathism. As to black skin itself, this is a question which is likely to remain long unsolved. Possibly the early forms of Homo sapiens were as densely pigmented as the Australian and the Negro, the latest types becoming progressively lighter.

The Tasmanians. Before summarizing the probable history of the Australians, let us turn to the question of the Tasmanians, who have been as variously accounted for as the former. Their geographical position and the fact of their being extinct furnish the elements of a perplexing problem. They differed from the Australians in having woolly hair, worn in short ringlets, and slightly shorter, broader heads. The fact that they were marginal in position even to the Australians has doubtless been largely responsible for theories that the Australians were of mixed racial origin, the Tasmanians being one, and the oldest, constituent. Hooton suggests that the latter are the earliest form of Melanesian Negro; Turner believed them to be originally a branch of the Negrito. However, their actual differences from the Australians are slight. Their hair appears not to have been strongly woolly, although Friedenthal[1] found from microscopic examination of a few hairs that it was comparable to that of typically woolly or frizzly-haired groups. Nothing of a Negritoid character is present in the cranium, though the shorter vault is obvious; aside from this every feature is quite Australoid. Morant, using the figures of other writers, found marked differences in the measurements of the palate, etcetera.

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[1] Friedenthal, 1913.

However, these differences vanish, excepting in the vault diameters, in the measurements of Hrdlička, whose standing as a technician needs no testimonial. Therefore, it seems judicious to accept the Tasmanians as an Australian population which has been modified, in part at least, by an incursion of woolly-haired Melanesians from the east which, if it ever arrived in Australia, was there too much diffused to have a visible effect.[1] Certainly it is more rational to suppose that the Tasmanians are the result of the action of some Melanesian influence (which is geographically available) in a small area, than to believe that the entire Australian population has been affected by the impact of a primitive Caucasoid type, now not found within thousands of miles, upon an earlier Tasmanoid stratum.

The Migrations of the Australians. Only four groups of people in the whole area which has been investigated give satisfactory physical evidence of a probable relationship with the Australians: these are found in Tasmania, New Caledonia, Northern New Britain and Ceylon. The evidence is weakest in the case of the last-named. Indications, but not evidence, exist to put other groups in the same class; these are some of the Dravidians and people of the Lesser Sunda Islands. Such indications may some day also be found in New Guinea. However, it seems clear that such people as the Sakai are not of this group.

The first home of the Australians was perhaps southern Asia. The type reached Australia and Tasmania from either Timor or New Guinea, or both, at a very early time, as the Talgai skull seems to show. It also managed to get to New Britain, New Ireland and New Caledonia, so that it must have been present in New Guinea. In other words, the type seems to have managed to reach the margins of the area of great land masses in the Pacific. The Australoids also either evolved in or spread through southern India and into Ceylon. It is most likely that all of these movements took place, not under the pressure of other peoples, but by an ancient and slow drift.

The chronological and evolutionary relationships of the Negritos are far from settled. However, all the evidence makes it appear that they spread through Southeast Asia and Oceania only after the Australoids had gone before, since the presence of Negritos or near-Negritos in several areas along the line of march through New Guinea, as they are at present found, would have constituted a serious deterrent to an Australoid migration which was probably not very populous or purposeful. The Negritos reached New Guinea, but not Australia, just as they appear to have spread through the South Indian forests without reaching Ceylon. As a matter of opinion, it is probable that there was a long lapse of time between the coming into the Pacific of the Australoids and that of the Negritos and Negroids. There seems to be no doubt from the circumstances that, as between the last two, the Negritos came first.

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[1] A somewhat parallel instance is afforded by Madagascar; the strong Oceanic influences which have affected this island are nowhere apparent on the mainland of Africa.

One last hypothesis is hesitantly offered to explain the extinction of the Australian in almost every realm but his own. He seems to have an inherently low potential for survival, and he has populated his own continent only extremely sparsely, even allowing for adversities of climate. Nor does his culture-level permit him the luxury of a large population. If this condition has always existed, and it probably has, it seems clear that in Indonesia and New Guinea there was not a great enough mass of the Australoid type to offer an obstacle to later invasions, even of the lowly Negrito, or to dominate, as a type, in many cases of mixture. Only in the marginal locations, the Bismarck Archipelago, Northern New Caledonia and Tasmania, due to some fortuitous circumstance or other, have the Australoids survived as an important element in mixtures with the later Negroids. As to Ceylon, the Australoid Vedda have been modified by some other strain, possibly the same White stock which is present in the Dravidians.

Summary

1. The Australians, characterized by a uniformly primitive morphology throughout the head and cranium, are, considering the area over which they are extended, remarkably homogeneous in physical type. Admixtures of Melanesian blood, which must have taken place in the north, have had little effect.

2. The Australians are a major race which represents an earlier stage in the development of Homo sapiens than does any other existing race. It has been preserved, with its primitive features,

through stagnation and isolation; its characteristic wavy hair is probably older than the woolly hair of the Negro.

3. Representatives of the Australoid race, mixed with other strains, are to be found in Tasmania, New Caledonia, the Bismarck Archipelago and Ceylon, and possibly also in Southern India and some of the Lesser Sunda Islands. The Sakai and Toala, however, are not related to the type, being rather of Negrito derivation.

4. The Australoid type originated on the Asiatic continent, perhaps in India, and spread into the Western Pacific as the first representative of modern man, probably at a very remote period. Outside of Australia, the Australoids have been extinguished or submerged everywhere except in a few marginal regions.

APPENDIX I

As this paper was in the final stages of printing, there appeared in Oceania, Vol. 7, no. 1, a paper by T. D. Campbell, J. H. Gray, and C. J. Hackett, entitled "Physical anthropology of the aborigines of Central Australia," with a series of nearly 200 males from a number of stations in this area. The means given below are those of two age groups.

	Age 26–45 (c. 95)	Age 45–X (c. 85)
Stature	168.66	167.26
Head length	195.60	194.74
Head breadth	140.05	141.72
Minimum frontal diameter	104.06	104.58
Bizygomatic diameter	139.38	141.54
Bigonial diameter	102.61	102.12
Face height	113.96	114.55
Nose height	49.47	51.29
Nose breadth	48.39	49.95
Cephalic index	71.6	72.79
Nasal index	97.8	97.4

These means fall throughout within the ranges of those in Table 25, although the head length seems greater in this region than the other figures indicate, allying the area more closely with the southern portion. The probability that the nose is somewhat higher in Central Australia seems to be corroborated.

APPENDIX II

TABLE 1. AUSTRALIAN MALES

NORTHWEST ARNHEM LAND

	No.	Range	Mean	S.D.	V.
Height	98	155–187	169.62± .40	5.94±.29	3.50±.17
Weight	99	81–180	121.40±1.02	15.10±.72	12.44±.60
Biacromial diameter	99	28–42	35.14± .16	2.31±.11	6.44±.31
Sitting height	98	72–92	82.02± .22	3.30±.16	3.98±.19
Chest depth	99	16–27	19.08± .12	1.82±.09	9.54±.46
Chest breadth	99	20–40	24.45± .16	2.34±.11	9.57±.46
Total hand length	98	168–211	188.70± .56	8.16±.39	4.32±.21
Hand length	98	89–121	106.56± .37	5.40±.26	5.07±.24
Hand breadth	98	69–95	82.48± .31	4.56±.22	5.53±.27
Head length	99	173–205	188.97± .53	7.83±.38	4.14±.20
Head breadth	99	126–152	138.01± .35	5.10±.24	3.70±.18
Head height	89	113–139	126.36± .38	5.34±.27	4.23±.21
Head circumference	97	478–597	530.90±1.17	17.04±.82	3.21±.16
Min. frontal diameter	95	93–116	104.78± .35	5.12±.25	4.89±.24
Bizygomatic diameter	98	130–154	139.75± .33	4.90±.24	3.51±.17
Bigonial diameter	98	90–121	105.26± .40	5.80±.28	5.51±.27
Total face height	96	95–129	113.05± .49	7.10±.35	6.28±.31
Upper face height	96	50–74	64.60± .34	4.90±.24	7.58±.37
Nose height	98	32–67	48.54± .32	4.64±.22	9.56±.46
Nose breadth	99	31–57	46.88± .26	3.78±.18	8.06±.39
Ear length	98	36–79	64.22± .34	5.00±.24	7.79±.38
Ear breadth	99	29–46	35.94± .18	2.70±.13	7.51±.36
Relative shoulder br.	98	18–25	21.26± .09	1.38±.07	6.49±.31
Relative sitting height	97	44–55	48.96± .12	1.74±.08	3.55±.17
Hand index	98	36–51	43.84± .16	2.40±.12	5.47±.26
Cephalic index	99	65–82	72.96± .20	2.88±.14	3.95±.19
Length-height index	89	58–75	67.01± .23	3.18±.16	4.75±.24
Breadth-height index	89	73–102	91.25± .34	4.83±.24	5.29±.27
Fronto-parietal index	95	69–86	75.97± .24	3.48±.17	4.58±.22
Cephalo-facial index	98	82–111	95.15± .25	3.72±.18	3.91±.19
Zygo-frontal index	94	68–83	75.02± .23	3.36±.16	4.48±.22
Fronto-gonial index	94	85–119	100.85± .44	6.35±.31	6.30±.31
Zygo-gonial index	97	63–83	75.37± .27	3.90±.19	5.17±.25
Facial index	95	70–97	80.98± .35	5.04±.25	6.22±.30
Upper facial index	95	37–57	46.37± .28	4.08±.20	8.80±.43
Nasal index	98	76–127	98.06± .66	9.68±.47	9.87±.48
Ear index	98	45–68	56.06± .33	4.80±.23	8.56±.41

TABLE 2. AUSTRALIAN MALES

VICTORIA RIVER

	No.	Range	Mean	S.D.	V.
Height.	28	155–181	169.29± .78	6.09± .55	3.60± .32
Weight.	28	91–170	125.90±2.09	16.40±1.48	13.03±1.17
Biacromial diameter	28	31–42	35.96± .29	2.28± .20	6.34± .57
Sitting height	28	75–89	82.12± .46	3.63± .33	4.42± .40
Chest depth	28	14–21	17.72± .23	1.80± .16	10.16± .92
Chest breadth	28	17–28	23.46± .25	1.98± .18	8.44± .76
Total hand length .	28	164–203	184.94±1.15	9.00± .81	4.87± .44
Hand length	28	92–115	104.88± .64	5.04± .45	4.80± .43
Hand breadth	28	69–95	81.04± .67	5.28± .48	6.52± .59
Head length	27	176–202	188.79± .75	5.82± .53	3.08± .28
Head breadth	27	126–146	138.88± .63	4.86± .45	3.50± .32
Head height	27	113–142	126.12± .79	6.12± .56	4.85± .44
Head circumference	28	502–573	537.50±1.67	13.08±1.18	2.43± .22
Min. frontal diam. .	28	93–120	104.50± .71	5.60± .50	5.36± .48
Bizygomatic diam.	28	125–149	137.90± .61	4.80± .43	3.48± .31
Bigonial diameter .	28	90–113	101.66± .90	7.02± .63	6.90± .62
Total face height . .	27	100–129	113.65± .81	6.25± .57	5.50± .50
Upper face height .	27	55–74	65.50± .61	4.70± .43	7.18± .66
Nose height	28	32–59	48.22± .61	4.80± .43	9.95± .90
Nose breadth	27	34–60	47.12± .56	4.35± .49	9.23± .85
Ear length.	28	44–75	63.06± .62	4.84± .44	7.68± .69
Ear breadth	28	29–43	35.46± .37	2.88± .26	8.12± .73
Relative shoulder br.	28	18–25	21.22± .19	1.52± .14	7.16± .64
Relative sitting ht.	28	44–51	48.64± .21	1.68± .15	3.45± .31
Hand index.	28	38–51	44.14± .35	2.78± .25	6.30± .57
Cephalic index	26	62–82	73.50± .47	3.54± .33	4.82± .45
Length-height index	26	58–75	67.07± .49	3.69± .34	5.50± .51
Breadth-height ind.	25	82–99	90.92± .60	4.47± .43	4.92± .47
Fronto-parietal ind.	27	66–83	75.01± .36	3.54± .32	4.72± .43
Cephalo-facial index	27	85–111	93.11± .57	4.41± .40	4.74± .44
Zygo-frontal index	28	64–87	75.22± .53	4.20± .38	5.58± .50
Fronto-gonial index	28	85–109	97.00± .75	5.85± .53	6.03± .54
Zygo-gonial index .	28	66–80	73.63± .45	3.54± .32	4.81± .43
Facial index	27	74–93	82.30± .61	4.72± .43	5.74± .53
Upper facial index	27	40–60	48.32± .50	3.87± .36	8.01± .74
Nasal index.	27	84–115	98.54±1.03	7.96± .73	7.47± .69
Ear index	28	45–80	56.50± .84	6.56± .59	11.61±1.05

Table 3. AUSTRALIAN MALES

Melville and Bathurst Islands

	No.	Range	Mean	S.D.	V.
Height	28	155–175	166.83± .58	4.56± .41	2.73± .25
Weight	28	91–160	125.50±1.86	14.60±1.32	11.63±1.05
Biacromial diameter	28	31–42	36.62± .24	1.86± .17	5.08± .46
Sitting height	28	78–92	83.08± .38	2.94± .26	3.54± .32
Chest depth	27	16–21	18.64± .14	1.10± .01	5.90± .54
Chest breadth	27	23–28	24.90± .18	1.38± .13	5.54± .51
Total hand length	28	168–195	183.66± .92	7.20± .65	3.92± .35
Hand length	28	95–112	104.88± .50	3.90± .35	3.72± .33
Hand breadth	28	72–92	81.04± .55	4.32± .39	5.33± .48
Head length	27	179–205	192.90± .84	6.48± .59	3.36± .31
Head breadth	27	129–146	136.00± .54	4.17± .38	3.07± .28
Head height	27	119–136	126.00± .49	3.75± .34	2.98± .27
Head circumference	28	502–573	539.66±2.20	17.28±1.56	3.20± .29
Min. frontal diam.	28	89–112	105.22± .65	5.12± .46	4.87± .44
Bizygomatic diam.	28	130–159	142.70± .69	5.45± .49	3.82± .34
Bigonial diameter	28	94–117	106.34± .73	5.76± .52	5.42± .49
Total face height	28	95–129	110.20± .90	7.10± .64	6.44± .58
Upper face height	28	50–74	61.45± .57	4.50± .41	7.32± .66
Nose height	28	36–59	45.34± .48	3.76± .34	8.29± .75
Nose breadth	27	40–57	47.33± .48	3.69± .34	7.80± .72
Ear length	28	52–75	62.66± .58	4.52± .41	7.21± .65
Ear breadth	28	32–43	35.79± .29	2.28± .21	6.37± .57
Relative shoulder br.	28	20–23	22.08± .07	0.82± .07	3.71± .33
Relative sitting ht.	28	46–53	49.64± .20	1.56± .14	3.14± .28
Hand index	28	42–49	44.36± .17	1.32± .12	2.98± .27
Cephalic index	26	65–76	70.50± .30	2.25± .21	3.19± .30
Length-height index	26	61–72	65.24± .31	2.34± .22	3.59± .34
Breadth-height index	26	85–99	92.81± .37	2.82± .26	3.04± .28
Fronto-parietal ind.	27	69–83	77.56± .37	2.85± .26	4.06± .34
Cephalo-facial index	27	91–114	98.54± .67	5.19± .48	5.27± .48
Zygo-frontal index	28	68–83	73.94± .40	3.12± .28	4.22± .38
Fronto-gonial index	28	85–114	100.95± .65	5.10± .46	5.05± .46
Zygo-gonial index	28	66–83	75.37± .39	3.06± .28	4.06± .37
Facial index	28	70–89	77.66± .60	4.72± .42	6.08± .55
Upper facial index	28	37–48	43.79± .31	2.40± .22	5.48± .49
Nasal index	27	80–127	103.58±1.43	11.00±1.01	10.62± .97
Ear index	28	45–68	57.50± .72	5.64± .51	9.81± .88

TABLE 4. AUSTRALIAN MALES

NORTHEAST ARNHEM LAND

	No.	Range	Mean	S.D.	V.
Height	77	155–178	166.98± .43	5.64± .31	3.38± .18
Weight	4	111–140	123.00±2.80	8.30±1.98	6.75±1.61
Biacromial diameter	77	28–39	34.64± .13	1.74± .09	5.02± .27
Sitting height	77	75–89	82.03± .24	3.15± .17	3.84± .21
Chest depth	76	16–21	18.84± .08	1.04± .06	5.52± .30
Chest breadth	76	20–31	23.40± .12	1.62± .09	6.92± .38
Total hand length	76	164–207	182.82± .61	7.92± .43	4.33± .24
Hand length	77	92–118	102.60± .37	4.80± .26	4.68± .25
Hand breadth	77	69–89	79.90± .33	4.26± .23	5.33± .29
Head length	77	179–211	190.14± .37	4.83± .26	2.54± .14
Head breadth	77	123–146	134.02± .71	4.50± .24	3.36± .18
Head height	76	98–133	120.30± .42	5.49± .30	4.56± .25
Head circumference	77	478–573	529.10±1.11	14.40± .78	2.72± .15
Min. frontal diam.	77	93–120	104.62± .35	4.60± .25	4.40± .24
Bizygomatic diameter	77	120–154	139.25± .40	5.20± .28	3.73± .20
Bigonial diameter	77	94–117	103.46± .41	5.32± .29	5.14± .28
Total face height	77	95–124	109.80± .45	5.90± .32	5.37± .29
Upper face height	77	50–74	62.15± .36	4.70± .26	7.56± .41
Nose height	76	40–59	46.54± .27	3.52± .19	7.56± .41
Nose breadth	76	40–57	47.48± .26	3.30± .18	6.95± .38
Ear length	76	52–75	63.30± .29	3.68± .20	5.81± .32
Ear breadth	76	29–46	35.76± .19	2.52± .14	7.05± .39
Relative shoulder br.	77	18–23	20.70± .06	0.82± .04	3.96± .21
Relative sitting height	77	44–53	49.28± .13	1.68± .09	3.41± .18
Hand index	76	36–47	43.58± .14	1.84± .10	4.22± .23
Cephalic index	77	65–76	70.35± .22	2.85± .15	4.05± .22
Length-height index	76	55–72	63.23± .25	3.27± .18	5.26± .29
Breadth-height index	76	79–99	89.78± .28	3.63± .20	4.04± .22
Fronto-parietal index	77	60–92	77.47± .34	4.41± .24	5.69± .31
Cephalo-facial index	77	88–111	98.03± .33	4.26± .23	4.35± .24
Zygo-frontal index	77	68–87	75.22± .20	3.64± .20	4.84± .26
Fronto-gonial index	77	85–114	99.00± .48	6.20± .34	6.26± .34
Zygo-gonial index	77	60–86	74.26± .31	4.08± .22	5.49± .30
Facial index	77	70–93	79.48± .36	4.72± .26	5.94± .32
Upper facial index	77	34–51	44.63± .27	3.48± .19	7.80± .42
Nasal index	76	80–131	103.90± .78	10.12± .55	9.74± .53
Ear index	76	45–68	56.54± .31	4.04± .22	7.14± .39

Table 5. AUSTRALIAN MALES

Roper River

	No.	Range	Mean
Height	8	152–178	166.50
Weight	8	101–180	130.50
Biacromial diameter	8	34–39	36.50
Sitting height	7	78–86	82.00
Chest depth	8	16–23	19.00
Chest breadth	8	23–28	24.36
Total hand length	8	176–203	186.62
Hand length	8	98–112	106.86
Hand breadth	8	78–95	83.86
Head length	8	182–205	193.86
Head breadth	8	120–146	137.14
Head height	7	116–142	127.71
Head circumference	8	502–561	542.06
Min. frontal diam.	7	97–116	108.78
Bizygomatic diameter	8	135–154	143.25
Bigonial diameter	8	98–117	107.50
Total face height	8	105–124	113.25
Upper face height	8	55–74	63.90
Nose height	8	40–55	45.50
Nose breadth	8	40–54	47.36
Ear length	8	56–71	64.50
Ear breadth	8	29–40	35.25
Relative shoulder br.	8	20–23	21.50
Relative sitting ht.	7	46–53	49.36
Hand index	8	42–47	44.00
Cephalic index	8	62–76	70.14
Length-height index	7	61–75	66.29
Breadth-height index	7	88–99	93.29
Fronto-parietal index	7	69–86	78.58
Cephalo-facial index	8	91–117	100.64
Zygo-frontal index	7	72–83	79.22
Fronto-gonial index	7	85–104	97.00
Zygo-gonial index	8	72–77	74.14
Facial index	8	74–85	78.50
Upper facial index	8	40–51	46.25
Nasal index	8	84–115	101.50
Ear index	8	49–68	56.50

Table 6. AUSTRALIAN MALES

Total Series

	No.	Range	Mean	S.D.	V.
Height	239	152–187	168.30± .26	5.94± .18	3.53± .11
Weight	167	81–180	123.30± .82	15.70± .58	12.73± .47
Biacromial diameter	240	28–42	35.60± .09	2.16± .07	6.07± .19
Sitting height	238	72–92	82.57± .14	3.24± .10	3.92± .12
Chest depth	238	14–27	18.80± .07	1.58± .05	8.40± .26
Chest breadth	238	17–40	24.06± .09	2.01± .06	8.35± .26
Total hand length	238	164–211	185.82± .37	8.48± .37	4.56± .14
Hand length	239	89–121	104.91± .23	5.28± .16	5.03± .16
Hand breadth	239	69–95	81.37± .20	4.68± .14	5.75± .18
Head length	238	173–211	189.93± .27	6.30± .19	3.32± .10
Head breadth	238	120–152	136.54± .23	5.25± .16	3.84± .12
Head height	226	98–142	124.29± .27	6.09± .19	4.90± .15
Head circumference	238	478–597	532.46± .71	16.32± .50	3.06± .09
Min. frontal diameter	235	89–120	104.82± .22	5.08± .16	4.85± .15
Bizygomatic diameter	239	120–159	139.85± .23	5.30± .16	3.79± .12
Bigonial diameter	239	90–121	104.46± .25	5.84± .18	5.59± .17
Total face height	236	95–129	111.70± .30	6.80± .21	6.09± .19
Upper face height	236	50–74	63.50± .22	4.95± .15	7.80± .24
Nose height	238	32–67	47.38± .19	4.36± .13	9.20± .28
Nose breadth	237	31–60	47.15± .16	3.72± .11	7.89± .24
Ear length	238	36–79	63.62± .20	4.56± .14	7.17± .22
Ear breadth	239	29–46	35.76± .11	2.58± .08	7.20± .22
Relative shoulder br.	239	18–25	21.18± .05	1.24± .04	5.85± .18
Relative sitting ht.	237	44–55	49.12± .07	1.70± .05	3.46± .11
Hand index	238	36–51	43.86± .09	2.18± .07	4.97± .15
Celphalic index	236	62–82	71.82± .14	3.24± .10	4.51± .14
Length-height index	224	55–75	65.51± .16	3.63± .12	5.54± .18
Breadth-height index	223	73–102	90.95± .20	4.32± .14	4.75± .15
Fronto-parietal index	233	60–92	76.63± .17	3.93± .12	5.13± .16
Cephalo-facial index	237	82–117	96.44± .21	4.80± .15	4.98± .15
Zygo-frontal index	234	64–87	75.02± .15	3.52± .11	4.69± .15
Fronto-gonial index	234	85–119	99.80± .28	6.40± .20	6.41± .20
Zygo-gonial index	238	60–86	74.77± .17	3.81± .12	5.10± .16
Facial index	235	70–97	80.14± .22	4.96± .15	6.19± .19
Upper facial index	235	34–60	45.71± .17	3.93± .12	8.60± .27
Nasal index	236	76–131	100.74± .45	10.16± .31	10.08± .31
Ear index	238	45–80	56.46± .21	4.92± .15	8.71± .27

Table 7. AUSTRALIAN FEMALES

Total Series

	No.	Range	Mean	S.D.	V.
Height	69	146–169	157.56± .43	5.34± .31	3.39± .19
Weight	56	71–120	95.90±1.01	11.20± .71	11.68± .74
Biacromial diameter	68	25–36	31.88± .17	2.04± .12	6.40± .37
Sitting height	69	60–86	76.90± .40	4.92± .28	6.40± .37
Chest depth	66	14–21	16.56± .11	1.38± .08	8.33± .49
Chest breadth	66	17–25	21.45± .10	1.26± .07	5.85± .34
Total hand length	68	156–195	174.54± .63	7.76± .45	4.45± .26
Hand length	68	86–109	97.11± .37	4.59± .26	4.73± .27
Hand breadth	68	66–86	74.50± .21	3.66± .21	4.91± .28
Head length	68	164–196	180.18± .52	6.36± .37	3.53± .20
Head breadth	65	120–140	130.51± .32	3.84± .23	2.94± .17
Head height	65	98–136	121.65± .48	5.70± .34	4.69± .28
Head circumference	68	454–537	506.06±1.15	14.04± .81	2.77± .16
Min. frontal diameter	68	89–120	101.22± .39	4.80± .28	4.74± .27
Bizygomatic diameter	68	120–144	128.55± .35	4.25± .25	3.30± .19
Bigonial diameter	68	86–109	95.62± .35	4.24± .24	4.43± .26
Total face height	66	90–114	102.30± .42	5.10± .30	4.98± .29
Upper face height	66	50–74	59.20± .35	4.25± .25	7.18± .42
Nose height	69	32–55	43.94± .30	3.68± .21	8.38± .48
Nose breadth	69	34–51	42.05± .25	3.03± .17	7.21± .41
Ear length	68	48–75	61.66± .32	3.96± .23	6.42± .37
Ear breadth	67	29–40	33.75± .17	2.04± .12	6.04± .35
Relative shoulder br.	68	16–23	20.18± .10	1.22± .07	6.05± .35
Relative sitting ht.	69	40–53	49.00± .17	2.10± .12	4.29± .25
Hand index	68	36–49	42.86± .18	2.14± .12	4.99± .29
Cephalic index	64	65–82	72.51± .26	3.12± .19	4.30± .26
Length-height index	65	55–78	68.18± .32	3.78± .22	5.54± .33
Breadth-height index	62	82–102	93.41± .31	3.57± .22	3.82± .23
Fronto-parietal index	64	69–86	76.99± .29	3.39± .20	4.40± .26
Cephalo-facial index	64	82–109	92.99± .38	4.47± .27	6.12± .36
Zygo-frontal index	67	72–91	78.50± .28	3.40± .20	4.33± .25
Fronto-gonial index	67	75–114	94.85± .42	5.10± .30	5.38± .32
Zygo-gonial index	67	66–86	74.26± .24	2.91± .17	3.92± .23
Facial index	65	70–93	79.14± .37	4.40± .26	5.56± .33
Upper facial index	65	40–57	45.56± .28	3.36± .20	7.37± .44
Nasal index	69	80–115	96.38± .66	8.08± .46	8.38± .48
Ear index	67	45–68	54.50± .35	4.24± .25	7.78± .45

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PAPERS
OF THE
PEABODY MUSEUM OF AMERICAN ARCHAEOLOGY
AND ETHNOLOGY, HARVARD UNIVERSITY

VOL. XVI—NO. 2

CONTRIBUTIONS TO THE RACIAL ANTHROPOLOGY OF THE NEAR EAST

BY
CARL C. SELTZER

BASED ON DATA COLLECTED BY
HENRY M. HUXLEY

WITH A FOREWORD BY HENRY M. HUXLEY

CAMBRIDGE, MASSACHUSETTS, U.S.A.
PUBLISHED BY THE MUSEUM
1940

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PRINTED BY THE GEORGE BANTA PUBLISHING COMPANY
MENASHA, WISCONSIN, U. S. A.

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5. Maronites
6. Nusairiyeh
7. Greek Orthodox
8. Gypsies

FOREWORD

The material which forms the basis of this report was collected during a residence of a year and a half in Syria and Palestine (1900–1901). The work was begun on the second trip of Mr. Howard Crosby Butler's expedition,[1] and was continued for another year after the return to America of the other four members of the party.[2] This additional work was made possible by the generosity of the original donors of the expedition, and finally through the support and unfailing interest of Mr. B. T. B. Hyde of New York.

Before starting for the interior I had the opportunity, through the courtesy of the officers of the Syrian Protestant College at Beirut, to make a number of observations on the students of that institution. The route and general features of Mr. Butler's expedition have been described in the reports of the other members. Suffice it to say that the general route was through northern and central Syria: north from Beirut to the vicinity of Aleppo, southeast through the desert to Palmyra and finally through the Haurân. On this trip the fellāhîn, the Bedawins and the Druse were the principal groups studied.

After the departure of the other members of the expedition in June, 1900, I went to Bhamdûn, a small village of the Lebanon; here I remained three or four months, engaged entirely in the study of the Arabic language.[3]

From the middle of October until the middle of December a second trip was made through northern and central Syria. From Beirut we went to Damascus and then north to Homs. Stopping at several villages on the way, I was enabled to make observations on the fellāhîn. We travelled through the desert to the east of Homs for about three weeks, spending the time among the fellāhîn of the plain and several tribes of the Anezī Bedawins. After visiting Hama we again entered the desert, marching north to is-Safîreh and then east to the Euphrates at Meskinah. This region was inhabited almost exclusively by nomadic tribes of Bedawins, or fellāhîn of Bedawin descent.

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[1] Butler, H. C. "Report of an American Archaeological Expedition to Syria 1899–1900." American Journal of Archaeology, second series. Journal of the Archaeological Institute of America, vol. IV, no. 4, pp. 415–440. New York, 1900.

[2] Huxley, H. M. "Preliminary Report of an Anthropological Expedition to Syria." American Anthropologist, n. s., vol. 4, no. 1, pp. 47–51. New York, 1902.

[3] Huxley, H. M. "Syrian Songs, Proverbs and Stories." Journal of the American Oriental Society, vol. XXIII, pp. 175–288. New Haven, 1902.

From Meskinah we proceeded in a northwesterly direction to Membej and then through the country of the Turkoman to Aintab. Again turning south we passed through Aleppo and then west into Jebel in-Nusairiyeh. The people of this mountainous section were at the time among the fiercest and most lawless of any in Syria. We were not molested, however, and even succeeded in measuring and photographing a number of the inhabitants. We reached the sea at Jebleh and then turned along the coast to Beirut.

The Samaritans of Nâblus, the ancient Shechem, seemed to us in many ways to be one of the most interesting groups of people in Syria. For three weeks I remained at Nâblus studying these people. After innumerable delays, which involved hours of talking and writing, I finally succeeded in obtaining measurements and photographs of forty-three Samaritans, in addition to a cast of the face of one of the sons of the High Priest. On account of the great historical interest which is almost universally felt in the Samaritans, the series of observations which we obtained may be counted as one of the most important results of the expedition.[1]

From the first of April, 1901, until the last of May we made a trip through Palestine, east and west of the Jordan. From Beirut we passed southeast through Banyâs, Kunêtrah, Simlîn and Khufsîn to Sumakh, on the southern shore of the Lake of Galilee. After visiting the most important of the Graeco-Roman ruins east of the Jordan, we marched south through Karak to Petra, the rock-bound city of the desert which was lost for many years and only rediscovered by Burkhardt in the early part of the nineteenth century. Returning from Petra to the same town of Tafîleh we descended from the plateau by a most precipitous and dangerous path to the Ghôr, or valley, returning south from the Dead Sea. After crossing the Ghôr we marched north to Hebron and then went through western Palestine stopping at Bethlehem, Jerusalem, Jericho, Nâblus and 'Akka as the principal places. From 'Akka we returned to Beirut along the coast. The people encountered on this trip were mainly the fellāhîn and Bedawins. A hurried trip was then made to Karyatên, where observations were made on a few members of Arab is-Slêb, a small tribe of Arabs about whose origin there is much speculation. At Jerusalem we made observations on the Syrian Gypsies.

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[1] Huxley, H. M. "The Samaritans: Anthropology." The Jewish Encyclopedia, vol. 10, pp. 675–676. New York, 1915.

The anthropological collection of the expedition consisted mainly of crania, casts and a series of costumes representative of the different parts of Syria. This material is deposited in the American Museum of Natural History in New York.

On account of the pressure of other duties, it became impossible for the writer to perform all of the detailed work necessary for the preparation for publication on the large series of data gathered in Syria. This task has perforce been delegated to the staff of the Peabody Museum of Harvard University who are keenly interested in the anthropology of the Near East.

I desire to express my obligation to the late Professor Frederic Ward Putnam of the Peabody Museum of Harvard University for his continued interest in the work of the expedition. My thanks are due to Dr. Franz Boas of New York for the valuable assistance rendered me in preparation for the work in Syria, and to the late Dr. Albert E. Post of Beirut, Syria, for his ever ready aid and advice, drawn from his extensive and, in fact, well-nigh unexcelled knowledge of the people and country of Syria and Palestine.

My heartiest appreciation is also due to the staff of the Peabody Museum, and especially to Dr. Carl C. Seltzer, for the study and preparation for publication of the measurements which were made on the various peoples of Syria and Palestine.

Henry M. Huxley

Chicago, Illinois
1939

NOTE

Several individuals, as well as institutions, are responsible for the appearance of this manuscript in its present form. To these the author has already personally expressed his grateful appreciation. Public acknowledgment of their many kindnesses are due, nevertheless, to Mr. Donald Scott, Director of the Peabody Museum of Harvard University; Professor Earnest A. Hooton, Chairman of the Division of Anthropology of Harvard University; Dr. Henry Field, Curator of Physical Anthropology at the Field Museum of Chicago; Professor Carleton S. Coon of Harvard University; and to Mr. M. S. Abourjaily. Especial acknowledgment is given to Mr. Henry M. Huxley, who was responsible not only for the collection of the data but also for initiating interest in the material.

Carl C. Seltzer

INTRODUCTION

The analysis of the data to be presented herewith has been to this writer a constant source of interest, satisfaction and surprise. It is particularly a surprise in the sense that seldom does one encounter anthropometric material collected in the early 1900's which is so important and so fruitful in its scope and implications and so extensive in the variety of measurements. These records are all the more significant in that they represent a survey of an area where good anthropometric data are particularly scanty, and also they were made at a time when certain groups of people were still identifiable as units and miscegenation had not progressed to its present intricacy. For it is only within the very last few years that physical anthropologists like Field, Coon, Hughes and Shanklin, trained in modern methods, have awakened to the racial importance of the Near Eastern area and have begun to compile large bodies of suitable data.

All of the raw material on which this study is based was collected by Mr. Henry M. Huxley, formerly a very keen student of Arabic linguistics and folklore. In 1900 and 1901 Mr. Huxley, as a member of the Howard Crosby Butler Archaeological Expedition to Syria, availed himself of the opportunity to examine, measure and photograph many groups of people in the area now identified as Syria, Lebanon, Palestine and Transjordan.[1] His anthropometric training for this work was derived from the laboratories of Professor Franz Boas of Columbia University and Professor F. W. Putnam of the Peabody Museum of Harvard University.

Many more individuals were examined by Mr. Huxley than are to be found listed in this study, but for reasons of age, size of series, question of ethnic classification, et cetera, the data were finally resolved into the groups given in Table 1. All the subjects in these groups are of adult age.

The Bedawin group consists of all Bedawin individuals not otherwise classified as to tribal affiliation. The Moslems are a general group containing all subjects of Moslem faith who are not Bedawins or who do not belong to other categories in our list.

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[1] These photographs, which are unusually clear, should be of special interest considering their age and the conditions under which they were taken.

The classification of the Samaritans, Turkomans, Druse and Gypsies should be perfectly clear and definite. The Nusairiyeh are agriculturists who live in the Nusairiyeh mountains and belong to the Shiite Moslems. The Greek Orthodox category contains a heterogeneous assortment of individuals with the common bond of confessing the Greek Orthodox faith. The wisdom of these groupings has been satisfactorily established, as the reader may soon see, by their physical distinctiveness and their metric homogeneity.

Table 1. GROUPS ANALYZED IN THIS STUDY

	Number of individuals	
	Male	Female
Bedawins	115	14
Moslems	258	
Samaritans	38	
Turkomans	19	6
Maronites	31	26
Druse	46	
Nusairiyeh	25	
Greek Orthodox	91	
Gypsies	11	

The following is a list and a very short description of the measurements and indices to be found in the analysis of the various Near Eastern groups of this study:

1. Stature	standing height without shoes taken with anthropometer.
2. Head length	maximum glabello-occipital length taken with spreading caliper.
3. Head breadth	maximum bi-parietal breadth taken with spreading caliper.
4. Head height	from middle of the auditory meatus to vertex taken with collector's own head height instrument.
5. Minimum frontal diameter	minimum breadth between the frontal crests taken with spreading caliper.
6. Inter-ocular diameter	diameter between the internal palpebral margins taken with spreading caliper.

7.	Bizygomatic diameter	maximum diameter between zygomatic arches taken with spreading caliper.
8.	Physiognomic face height	distance between hairline and menton taken with sliding caliper.
9.	Total face height	distance between nasion and menton taken with sliding caliper.
10.	Upper face height	distance from nasion to mouth taken with sliding caliper.
11.	Nose height	distance from nasion to junction of upper lip and septum taken with sliding caliper.
12.	Nose breadth	distance between alae of nose horizontally taken with sliding caliper.
13.	Mouth breadth	breadth of mouth from corner to corner taken with sliding caliper.
14.	Lip thickness	vertical distance from junction of upper integumental and membranous portion of lips to the junction of lower integumental and membranous portions, taken with sliding caliper.
15.	Ear length	maximum vertical length of the ear taken with sliding caliper.
16.	Hand squeeze	maximum hand squeeze taken with hand dynamometer.
17.	Cephalic index	head breadth × 100 divided by head length.
18.	Length-height index	head height × 100 divided by head length.
19.	Breadth-height index	head height × 100 divided by head breadth.
20.	Fronto-parietal index	minimum frontal diameter × 100 divided by head breadth.
21.	Cephalo-facial index	bizygomatic diameter × 100 divided by head breadth.

22. Zygo-frontal index	minimum frontal diameter × 100 divided by the bizygomatic diameter.
23. Total facial index	total face height × 100 divided by the bizygomatic diameter.
24. Upper facial index	upper face height × 100 divided by the bizygomatic diameter.
25. Nasal index	nose breadth × 100 divided by nose height.

In addition to the above measurements and indices, graded observations have been tabulated with respect to hair color, eye color and skin color on exposed and unexposed parts of the body.

The technique and accuracy of the measuring seem to have been on the whole quite good. There are, however, one or two exceptions which must be considered. After a careful examination of the photographs as well as the means of the measurements themselves, it appears to this writer that Huxley failed to find the nasion point accurately. All the evidence points to an erroneously low determination of the junction of the nasal and frontal bones. Accordingly throughout this analysis the reader must keep in mind the fact that the mean total facial heights and the nose heights are probably several millimeters too small. The upper face height dimension, however, is quite possibly comparable to nasion-prosthion height, inasmuch as the unduly low placing of the nasion point is somewhat offset by the distance between prosthion and the junction of the lips. As far as head height is concerned little can be said with confidence. The means are truly very high, but from known facts as well as from the evidence of the photographs of this series of people, it appears that they do possess unusually high cranial vaults.

The usual statistical constants were calculated for all the measurements and indices. The letters "S.D." and "C.V." refer to the standard deviation and the coefficient of variation respectively. All the probable errors were computed with the assistance of Pearson's table of X_1 and X_2.[1]

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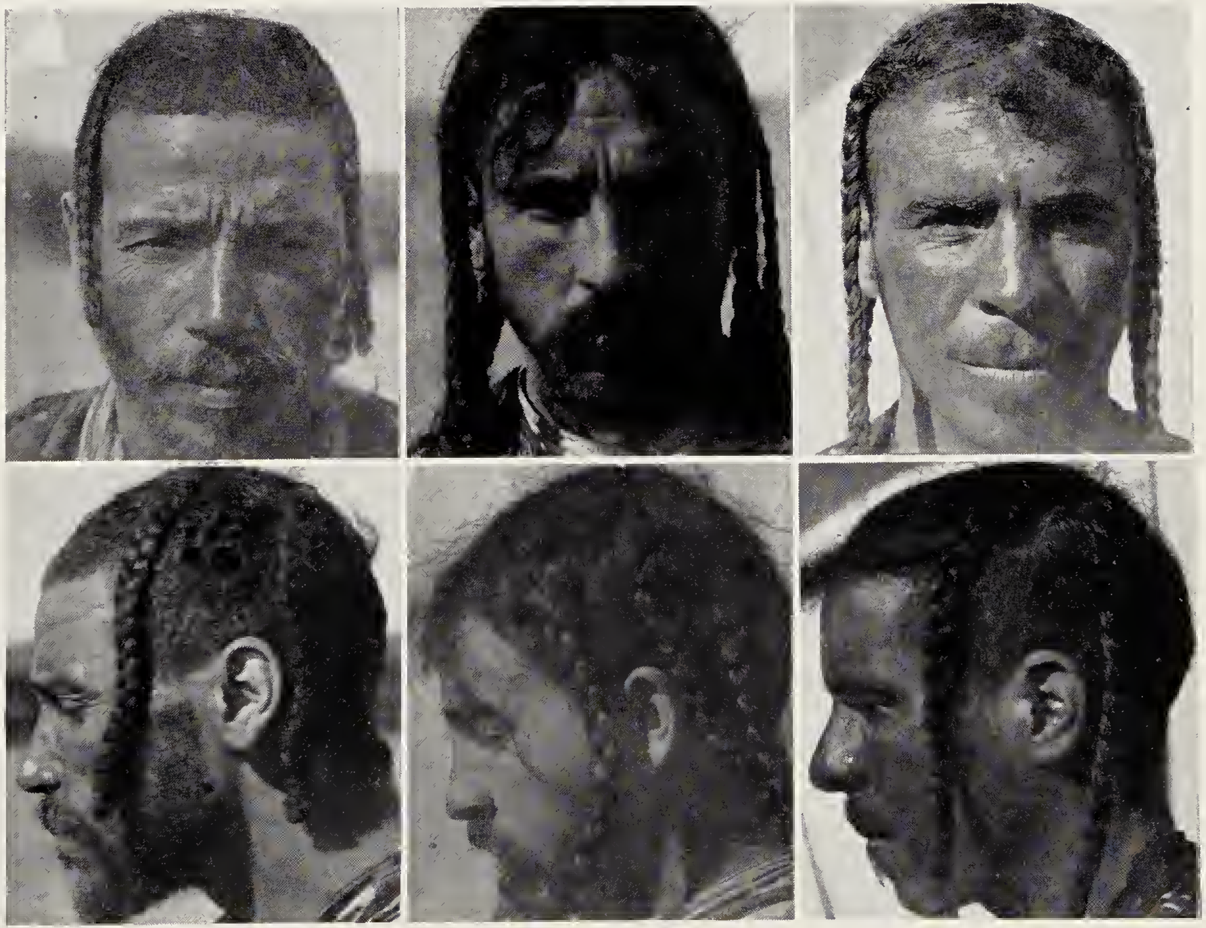
[1] Pearson, 1924.



BEDAWINS

THE BEDAWINS OF THE NEAR EAST

Our Bedawin series consists of 115 males and 14 females of adult age; the males range from 18 to 65 years and the females from 20 to 59 years. If we may consider homogeneity of pigmentation of hair and eyes as an indication of purity of this stock, then it may be said that our Bedawin series is unusually homogeneous. Out of 113 males recorded for eye color only 12, or approximately 10 per cent, fall into the mixed light eye classification including gray, blue and hazel eyes, the vast majority showing the straight brown forms. Only 1 of the 14 female Bedawins presents a mixed light eye color and this is tabulated as hazel. With respect to hair color the male Bedawins show virtually 90 per cent of their numbers with black, dark brown and brown head hair colors; the remaining 10 per cent possess gray and white hair. All of the 14 females have either black or dark brown hair. If we compare our pigmentation data with that of Shanklin's Akeydat and Maualy Bedawins, we find the Bedawins measured by Huxley to be considerably more homogeneous. As many as 46 per cent of the Akeydat Bedawins are recorded by Shanklin as having mixed light eyes and about 23 per cent of the Maualy have been observed to show this same condition.[1] This superior homogeneity of our Bedawin series is not confined alone to pigmentation, for with respect to metric and indicial features the Huxley data are certainly less heterogeneous than Shanklin's Akeydat Bedawins, and possibly less variable than the Maualy group. As far as skin color is concerned, we find that, according to Table 2, the predominant tones for the unexposed parts are reddish brown in approximately one-third of the male Bedawin group and some shade of yellow in somewhat less than one-half of the total number. The reddish brown takes the form of light red brown and copper color, while the yellow is an olive yellow and a yellowish white. The tanning differential as indicated by the color of the skin on the exposed parts is not excessive. The considerable increases, however, in the copper colored and light brown categories are quite notable.

The Bedawin males of this study are of moderate stature with a mean of 166.86 centimeters. Out of the 112 individuals in this

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[1] Shanklin, 1936.

Table 2. BEDAWIN MALES

Measurements, Indices and Observations

Measurements	No.	Range	Mean	S.D.	C.V.
Age	106	18– 65	38.85±0.97	14.75±0.68	37.97±1.76
Stature	112	152–187	166.86±0.38	6.03±0.27	3.61±0.16
Head length	115	164–202	189.09±0.34	5.46±0.24	2.89±0.13
Head breadth	115	135–155	144.46±0.27	4.32±0.19	2.99±0.13
Head height	114	114–153	134.50±0.42	6.68±0.30	4.97±0.22
Min. frontal diam.	115	93–116	103.42±0.27	4.24±0.19	4.10±0.18
Inter-ocular diam.	115	25– 39	31.40±0.17	2.76±0.12	8.79±0.39
Bizygomatic diam.	115	120–149	135.30±0.33	5.30±0.24	3.92±0.17
Physiognomic face ht.	49	159–206	182.16±0.91	9.48±0.65	5.21±0.35
Total face height	115	100–144	119.70±0.44	7.00±0.31	5.85±0.26
Upper face height	115	60– 89	74.05±0.31	4.90±0.22	6.28±0.28
Nose height	115	40– 63	52.70±0.22	3.56±0.16	6.76±0.30
Nose breadth	115	28– 48	36.41±0.19	3.00±0.13	8.24±0.37
Mouth breadth	86	40– 61	52.70±0.26	3.58±0.18	6.79±0.35
Lip thickness	85	6– 23	14.74±0.23	3.14±0.16	21.30±1.10
Ear length, right	61	53– 76	63.40±0.44	5.10±0.31	8.04±0.49
Hand squeeze, right	108	14– 61	37.14±0.65	9.96±0.46	26.82±1.23
Hand squeeze, left	107	8– 61	35.49±0.70	10.74±0.50	30.26±1.40
Indices					
Cephalic index	115	68– 88	76.29±0.19	2.97±0.13	3.89±0.17
Length-height index	114	61– 81	71.09±0.23	3.63±0.16	5.10±0.23
Breadth-height index	114	79–108	93.14±0.32	5.04±0.23	5.41±0.24
Fronto-parietal index	115	63– 80	71.56±0.17	2.67±0.12	3.73±0.17
Cephalo-facial index	115	85–105	93.65±0.22	3.42±0.15	3.65±0.16
Zygo-frontal index	115	68– 87	76.66±0.20	3.12±0.14	4.07±0.18
Total facial index	115	70–109	88.60±0.39	6.15±0.27	6.94±0.31
Upper facial index	115	46– 66	54.74±0.22	3.42±0.15	6.25±0.28
Nasal index	115	48– 95	69.46±0.44	7.04±0.31	10.14±0.45

Observations

Hair Color	No.	%
Black	81	74.32
Dark brown	16	14.68
Brown	1	.92
Gray	10	9.17
White	1	.92
Total	109	100.01

Eye Color	No.	%
Dark brown	20	17.70
Brown	81	71.68
Hazel	4	3.54
Gray	6	5.31
Blue	2	1.77
Total	113	100.00

Skin Color (unexposed)	No.	%
Copper colored	8	8.08
Olive yellow	27	27.27
Yellowish white	16	16.16
Pale white	1	1.01
Light brown	19	19.19
Light red brown	28	28.28
Total	99	99.99

Skin Color (exposed)	No.	%
Dark yellow brown	1	.93
Copper colored	27	25.00
Olive yellow	21	19.44
Yellow white	5	4.63
Light brown	43	39.81
Light red brown	3	2.78
Others	8	7.41
Total	108	100.00

group only about 15 per cent may be classified as tall with standing heights greater than 172 centimeters. By far the great majority group themselves between 164 and 172 centimeters. In absolute head dimensions the Bedawins are fairly long, distinctly narrow and high. The mean cephalic index of 76.29 places the Bedawins in the dolichocephalic class. Only 3 out of 115 males have brachycephalic indices of 83 or higher. The hypsicephaly of this group is due more to the extreme height of the head than to the size of the antero-posterior diameter. The breadth-height index of 93.14 is very significant as indicating a head height unusually great in proportion to breadth.

The Bedawin forehead is very narrow, as is also the distance between the eyes measured from the inner palpebral margins. The length of the face from the hairline to menton is of moderate dimension with a mean of 182.16 millimeters. The nasion-menton face height is not very great, but the upper face height of these Bedawins is of considerable magnitude. The latter dimension is indicative of the fact that the length of the face is principally a function of the nasion-prosthion length and that the height of the lower jaw is notably small. In face breadth the Bedawins are markedly narrow with a mean of 135.30 millimeters. This gives this group a leptoprosopic face with respect to the total facial proportions, and a decidedly leptene face as regards the upper facial area. The mean cephalo-facial index of 93.65 is rather high, considering the narrow facial breadth of the group. The minimum frontal diameter expressed as a percentage of the bizygomatic diameter, yielding a mean zygo-frontal index of 76.66, indicates a narrow forehead relative to the breadth of the face.

The Bedawin nose is long but not excessively so. In breadth, however, the nose reaches considerable magnitude with a mean of 36.41 millimeters. Thus the Bedawin possesses a nose which is proportionately medium long and broad and borders on mesorrhiny. And finally, the Bedawin males lack outstanding characteristics with respect to breadth of mouth and thickness of lips.

Table 3 contains the number, range and means for the measurements and indices of the Bedawin females, as well as a percentage tabulation of the female means in terms of those of the males. Owing to the small size of the series it was not deemed advisable to calculate constants of variability and probable errors. A cursory glance at these figures will show that on the whole the females present the general characteristics and proportions of the male Bedawins. There are perhaps merely one or two points worthy of mention. The first concerns itself with the unusually small bizygomatic mean diameter of 124.50, a mean which is only 92.0 per cent of the size of the corresponding male mean. The other is the comparatively high mean zygo-frontal index of 81.50 compared to the mean of the males which is considerably lower and has a value of 76.66. The higher mean of the females is the consequence of their extremely narrow bizygomatic diameters

TABLE 3. BEDAWIN FEMALES

Measurements, Indices and Observations

Measurements	No.	Range	Mean	Female Mean as a Percentage of Male Mean
Age	14	20– 59	36.30	. .
Stature	14	143–166	152.13	91.2
Head length	14	164–196	183.00	96.8
Head breadth	14	129–149	139.42	96.5
Head height	12	110–141	130.18	96.8
Minimum frontal diameter	14	93–108	101.34	98.0
Inter-ocular diameter	14	25– 36	30.71	97.8
Bizygomatic diameter	14	115–129	124.50	92.0
Physiognomic face height	6	151–178	165.82	91.0
Total face height	14	95–124	109.85	91.8
Upper face height	14	60– 84	70.20	94.8
Nose height	14	40– 59	47.76	90.6
Nose breadth	14	28– 42	34.13	93.7
Mouth breadth	11	44– 57	50.32	95.5
Lip thickness	11	6– 21	13.40	90.9
Ear length, right	5	56– 67	61.80	97.5
Indices				
Cephalic index	14	68– 82	76.08	99.7
Length-height index	12	66– 77	70.70	99.4
Breadth-height index	12	82– 99	92.00	98.8
Fronto-parietal index	14	60– 80	71.29	99.6
Cephalo-facial index	14	85– 96	89.21	95.3
Zygo-frontal index	14	76– 87	81.50	106.3
Total facial index	14	70–104	87.00	98.2
Upper facial index	14	46– 63	55.79	101.9
Nasal index	14	60– 87	70.34	101.3

Observations

Eye Color	No.	%
Dark brown	3	21.43
Brown	10	71.43
Hazel	1	7.14
Totals	14	100.00

rather than the result of any particular function of the forehead breadth.

From this analysis of the physical characteristics of the Bedawins the racial provenience of the group becomes perfectly clear. What we are dealing with here is a people of a comparatively high degree of homogeneity and predominantly of Mediterranean-Arab stock. There is no implication, however, that small amounts of admixture of other racial strains are lacking. Table 4 is presented with the hope that a sorting on the basis of eye color may reveal suggestions of foreign elements. In this table we have the means for the measurements and indices of dark brown-eyed, brown-eyed and mixed light-eyed Bedawin males. Out of the total of 113 individuals, 20 fall into the dark brown-eyed classification, 81 into the brown-eyed group and only 12 have mixed light eyes. If we compare the mixed light-eyed group with the dark brown-eyed class we find that the former are considerably taller in stature (by almost 4 centimeters); greater in head length; somewhat

Table 4. BEDAWIN MALES BY EYE COLOR

Measurements	Dark Brown 20	Brown 81	Mixed Light 12
Age	29.35	40.60	38.80
Stature	164.10	166.92	168.00
Head length	187.80	189.36	188.49
Head breadth	144.55	144.58	144.01
Head height	133.70	134.70	134.18
Minimum frontal diameter	103.30	103.54	103.18
Inter-ocular diameter	31.55	31.34	31.49
Physiognomic face height	180.50	182.34	184.94
Bizygomatic diameter	136.25	135.10	135.35
Total face height	119.00	117.00	120.35
Upper face height	73.25	74.05	74.90
Nose height	52.30	54.30	52.50
Nose breadth	35.90	36.47	36.74
Mouth breadth	52.38	53.06	52.32
Lip thickness	14.88	14.88	14.30
Ear length, right	60.99	65.22	64.20
Indices			
Cephalic index	76.95	76.26	75.99
Length-height index	71.15	71.12	71.24
Breadth-height index	92.75	93.14	93.50
Fronto-parietal index	71.05	71.71	71.26
Cephalo-facial index	93.95	93.47	94.25
Zygo-frontal index	76.10	76.82	75.98
Total facial index	87.75	88.85	89.50
Upper facial index	53.45	54.92	53.00
Nasal index	70.30	69.34	69.82

narrower in head breadth; possibly higher in head height; narrower in forehead breadth; narrower in face breadth; greater in physiognomic face height, total face height, upper face height and nose height; broader in the nose; thinner in the lips; and considerably longer in the ears. Indicially the mixed light-eyed class is more dolichocephalic, more acrocephalic, has a higher cephalo-facial index, is considerably more leptoprosopic, somewhat less leptene and more leptorrhine. The brown-eyed group is intermediate to the other two eye color classes in stature, physiognomic face height, upper face height, nose breadth, cephalic index, breadth-height index and total facial index. Although it is a risky task to make generalizations based on means of a very small group containing only 12 individuals, in this particular instance the mixed light-eyed element shows such an overwhelming complex of deviations indicative of a clear-cut racial complex that this writer feels perfectly safe in attributing the characteristics of the group to the presence of a Nordic strain. The size of the total Bedawin series, as well as the absence of much detailed data of a morphological character, makes it impossible to detect other racial elements. Whatever they are they must perforce be of a very minor nature. In summary this Bedawin group can be said to be of predominantly pure Mediterranean-Arab stock, plus a small element of Nordic admixture, and with a trace of Iranian Plateau blood.[1]

In Table 5 our Bedawin series is compared with a number of groups with whom it is thought racial association may be demonstrated. All of the groups, with the exception of the Riffian Arabs, live in approximately the same general area in the Near East.[1]

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[1] The term "Iranian Plateau" refers to a specific race type which has been identified very recently by Dr. Henry Field of the Field Museum of Chicago. In analyzing a very extensive series of anthropometric measurements and observations gathered in Iran and Iraq, Field found that he was able to isolate a very distinctive brunet White race presenting the following characters: black or dark brown wavy hair, brown eyes, very abundant beard and body hair, moderate to short stature, long and narrow heads, long and narrow faces with prominent bony structures and an extreme degree of nasality. It is this nasality which is the outstanding feature of the race. The nose is always very high and very prominent. The profile is sometimes straight but is almost always very strongly convex or concavo-convex. The tip of the nose is depressed and slopes downward and is of moderate thickness with strong recurvation of the alae.

The importance of this discovery cannot be overestimated. Heretofore, this dominant nasality has been referred to as an "Armenoid" feature and was used as an identifying character for the so-called "Armenoid race." Owing to Dr. Field's brilliant analysis of his Iran material, however, this extreme nasality is not to be ultimately referable to the round-headed Armenoids but to the long-headed Iranians.

For full details as to the derivation and source material for Dr. Field's "Iranian Plateau" race the reader is referred to his monograph entitled "Contributions to the Anthropology of Iran" (1939).

It is interesting to note that confirmation of Dr. Field's point of view is contained in a very large and comprehensive anthropometric study of more than a thousand Armenians by Dr. Byron O. Hughes of the University of Michigan, "The Physical Anthropology of Native Born Armenians," doctor's thesis submitted to the Division of Anthropology of Harvard University in 1938 and as yet unpublished. In this work Hughes finds that the Armenoids are not a primary subrace within the White division of mankind, but are a composite and secondary subrace derived from a mixture of Alpine and Iranian Plateau elements.

The fundamental differences between our Bedawins and the Moslems seem to be in the possession by the former of shorter statures, longer and narrower heads, distinctly lower cranial vaults, narrower foreheads, narrower faces, and somewhat shorter total facial and upper facial diameters. There is virtually no difference in the nasal dimensions and in respect to relative proportions of these dimensions the two groups are identical. Both series are basically Mediterranean-Arab in racial origin, but their disparity lies in the fact that the Moslems have a strong element of Alpine and Iranian Plateau blood (Armenoid) which in the Bedawins is present only to the very slightest degree.

TABLE 5. COMPARISON BETWEEN BEDAWIN MALES AND OTHER NEAR EASTERN GROUPS

	Bedawins (This Study)	Moslems (This Study)	Turkomans (This Study)	Akeydat (Shanklin)[1]	Maualy (Shanklin)[1]	Rwala (Shanklin)[2]	Mesopotamian Arabs (Ehrich)[3]	Riffian Arabs (Coon)[4]
NUMBER	115	258	19	120	176	270	33	93
re............	166.86	168.00	169.74	168.50	170.12	161.9	171.28	167.98
length........	189.09	184.98	191.04	191.35	190.42	191	190.44	194.33
breadth.......	144.46	147.28	143.89	146.14	147.06	144	146.21	145.13
height........	134.50	136.26	136.54	122.76	125.36	. .	. .	127.66
frontal diam...	103.42	104.86	104.62	117.64	118.50	104	104.15	104.54
gomatic diam...	135.30	137.25	135.70	134.58	135.91	130	137.73	135.14
l face height....	119.70	120.65	120.40	123.32	124.04	119	128.67	123.37
er face height...	74.05	74.60	75.25	71.82	73.00	70	79.09	72.12
height........	52.70	52.98	54.14	54.66	55.42	55	58.52	53.86
breadth.......	36.41	36.71	35.78	36.28	36.82	35	35.39	35.47
alic index......	76.29	79.74	75.33	76.39	77.28	75.0	76.25	74.64
th-height index.	71.09	73.79	71.15	64.15[5]	65.83[5]	. .	. .	65.63
dth-height index	93.14	92.45	95.78	84.00[5]	85.24[5]	. .	. .	88.02
to-parietal index	71.56	71.17	72.37	80.50[5]	80.58[5]	72.72[5]	71.21	72.00
alo-facial index.	93.65	93.20	95.15	92.09[5]	93.00[5]	90.28[5]	94.21	93.06
-frontal index...	76.66	76.62	76.22	87.41[5]	87.19[5]	80.00[5]	74.88	77.36[5]
l facial index...	88.60	88.00	87.80	91.90	92.34	91.7	93.36	91.33
er facial index...	54.74	54.41	55.37	53.4	53.8	53.9	57.42	53.36
l index........	69.46	69.46	66.14	65.95	66.26	63.7	60.73	66.29

hanklin, 1936.
hanklin, 1935.
hrich, unpublished measurements in the Peabody Museum.
[4] Coon, 1931.
[5] Index of means.

The Bedawins when compared with the Turkomans are shorter in stature, somewhat more brachycephalic but not very much so (.96 index units), distinctly lower in the cranial vault, and a little narrower in the forehead but approximately the same dimension in the width of the face. They are also a little shorter in the total and upper facial diameters, shorter in nose height and somewhat greater in the width of the nose across the alae. The Bedawins have somewhat lower length-height, breadth-height, fronto-parietal and cephalo-facial indices, but are a little higher in the total facial index and considerably higher in the nasal index. These differences are in the main not very great and it appears that there is a strong racial affinity between the Bedawins and the Turkomans. Where they do differ is in the possession by the latter of a little stronger element of Iranian Plateau stock. It must be remembered, however, that even in the Turkomans the Iranian Plateau strain does not reach strong proportions.

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[1] Coon, 1931.

Differences in technique of measurement make it very difficult to compare our Bedawin series with Shanklin's Akeydat, Maualy[1] and Rwala[2] Bedawins. The principal disparities occur in head height, total and upper face height, nose height and minimum frontal diameter. Shanklin's head height means appear to be too low, while Huxley's measurements for this diameter may possibly be somewhat too high. In the case of the minimum frontal diameter Shanklin's means seem to be excessive and are probably due to an error common among observers of allowing the calipers to slip off the frontal crests posteriorly onto the temporal muscle area. It has already been pointed out that our total face height is probably a little too short owing to faulty location of the nasion point which Huxley consistently underestimated. Our upper face height diameter may be a millimeter or two on the long side and the nasal height is probably too short.

In spite of all these disagreements in technique certain general indications appear from the data. Our Bedawins are shorter in stature than the Akeydat and have shorter head lengths but also narrower head widths. The cephalic indices for the two groups, however, are essentially the same. The Bedawin face is somewhat broader and, taking all differences in technique into consideration, it may very well be that the Bedawins have somewhat longer total facial and upper facial dimensions, as well as a longer nasal height. The two groups are virtually identical in nose breadth. None of the differences mentioned above are very large and it would appear to be safe to conclude that the Bedawins of this study and Shanklin's Akeydat are closely related in physical characteristics. Both groups are racially predominantly of Mediterranean stock. Where they differ is in the possession by the Akeydat of more Nordic and mixed Nordic strains than is to be found in the Bedawins. This is to be seen in the much higher proportion of mixed light-eyed individuals in the Akeydat series.

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[1] Shanklin, 1936.

[2] Shanklin, 1935.

Shanklin's Maualy are taller than our Bedawins and have longer heads and broader skull vaults. In the cephalic index they are only slightly higher than the Bedawins. After estimating technique differences it is highly probable that the two groups are relatively similar in facial breadth, facial length and in nasal dimensions. Again we may conclude that our Bedawins and Maualy Bedawins are closely related and that their principal difference is in the quantity of Nordic admixture in the two series. The Maualy have a stronger Nordic strain than the Bedawins of this study as evidenced by their greater stature, greater cranial dimensions and a greater proportion of individuals with mixed light eye colors.

Our Bedawin series differs from Ehrich's Mesopotamian Arabs in many respects.[1] The Mesopotamian Arabs are taller in stature and have greater cranial length and breadth diameters. They do agree, however, in the value of the cephalic index. The Arabs are, moreover, broader in the face and longer in the total facial height, upper face height and nose height diameters. It may be possible that the great size of the length dimensions in the Arab face is a result of the personal equation of the observer in the location of the nasion point. All in all, our Bedawins and Ehrich's Mesopotamian Arabs are not very distant racially. They both are predominantly Mediterranean, with the latter showing a greater proportion of mixed Nordic blood.

After close examination of the comparable measurements between the Riffian Arabs and our Bedawins, it would appear that on the whole the two groups are distinctly related. They are both predominantly Mediterranean, but the Riffian Arabs have more Nordic admixture while the Bedawins have more of the Iranian Plateau-Armenoid strains.[2]

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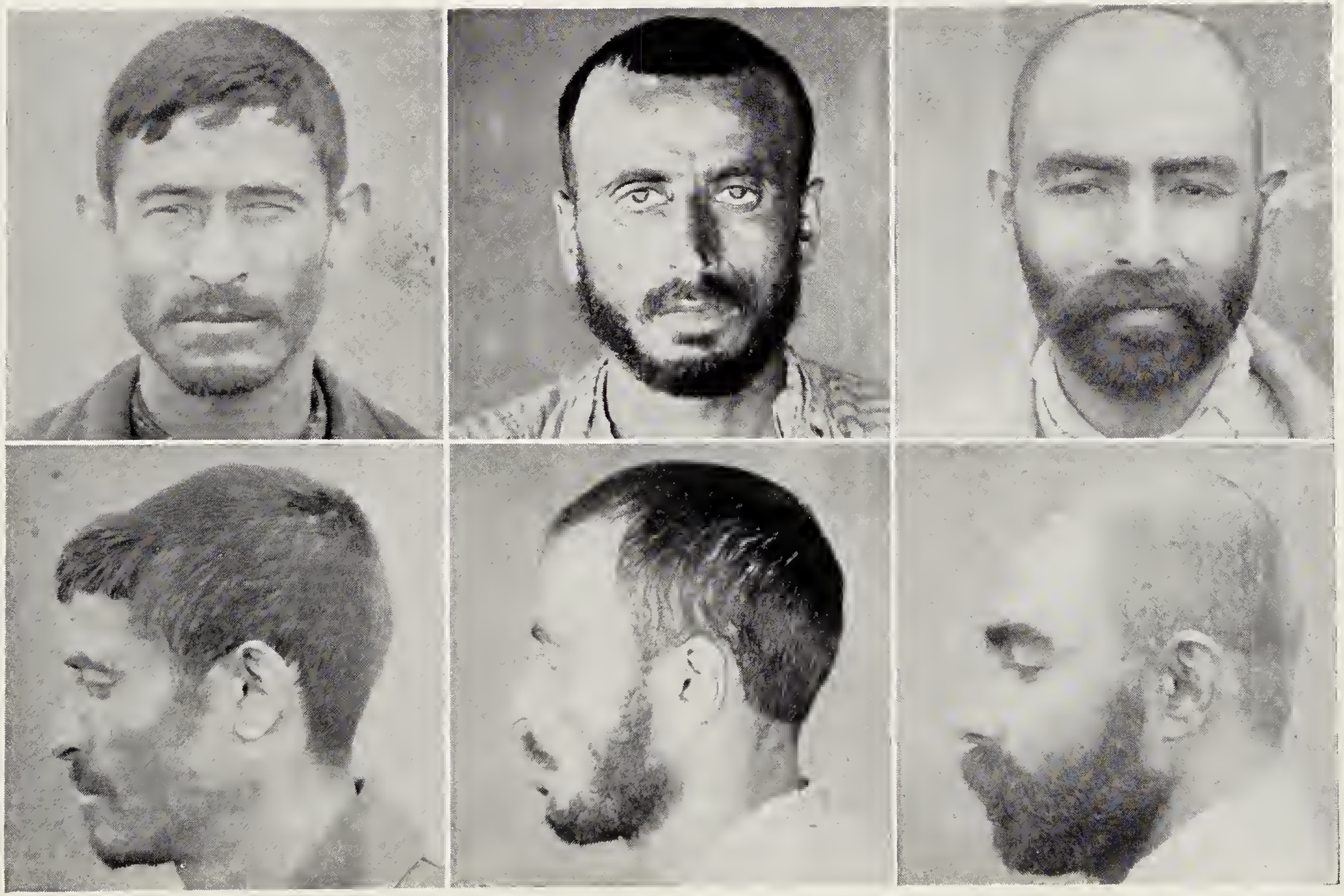
[1] Ehrich, unpublished measurements in the Peabody Museum.

[2] In order that the reader may avoid any confusion with respect to varying terminology, the following remarks apply. Wherever the term "Iranian Plateau" occurs alone there is reference to the long-headed, beak-nose race type described in a previous note. The term "Armenoid" is used to refer to the firm fusion of Alpine and Iranian Plateau strains as described by Hughes. In some instances I have utilized the phrases "Iranian Plateau-Armenoid" and "Iranian Plateau and Armenoid." The addition of the words "Iranian Plateau" is simply for the purpose of reminding the reader of the presence in the combination of this element.



Moslems

THE MOSLEMS OF THE NEAR EAST

The Moslem male series includes 258 individuals with a mean age of 37.70 years. In pigmentation this group is much more variable than the Bedawins. Although both groups possess approximately the same proportion of individuals with dark brown eyes, the Moslems show a smaller percentage of brown eyes and a much larger proportion of mixed light eyes. The actual figures for mixed light-eyed individuals are 27.50 per cent for the Moslems and 10.62 per cent for the Bedawins. In hair color the same condition with respect to pigmentation differences holds true. The Moslem group has a much smaller proportion of individuals with dark brown and brown hair. It is worthy of note that although the mean ages of both the Moslem and Bedawin series are almost identical, the former shows a higher proportion of individuals with head hair colors recorded as gray or white. Skin color is also lighter among the Moslems (for exposed parts) with light brown and very light brown colors found in about 40 per cent of the group, and yellowish white, pale white and ruddy white comprising almost half of the total series.

In stature the Moslems are somewhat taller than the Bedawins with a mean of 168.00 centimeters. Thus this group may be said to be of moderate stature with a distinct inclination towards the tall side. Head length among the Moslems is short and the breadth of the cranial vault is quite narrow, albeit broader than that of the Bedawins. The mean cephalic index of 79.47 for the Moslems falls into the middle of the mesocephalic classification. The height of the Moslem head is very great and accounts for the hypsicephalic proportions of the vault in spite of the shortness of the longitudinal diameter. The mean breadth-height index of 92.45 is markedly acrocephalic.

The Moslems are narrow in the width of the forehead and in the distance between the internal margins of the eyes. In these two dimensions, nevertheless, they somewhat exceed the Bedawins. This same superiority in lateral head dimensions may also be seen in the width of the face, since the Moslems have a mean maximum bizygomatic diameter of 137.25 millimeters. Physiognomic face height is greater among the Bedawins than the Moslems, which indicates greater distance from nasion to the margin of the hairline. This is seemingly in contradistinction to the above where it was noted that the Moslems possessed a higher cranial vault than the Bedawins. This cranial picture, however, is in reality quite clear. What we have among the Bedawins is a well-rounded forehead of considerable height which soon levels off in the bregma region; in the Moslems the forehead is lower and more sloping, and the cranial vault continues to rise to a point further back towards the occiput. The Moslem antero-posterior contour of the cranial vault then has a tendency to incline in the direction of the characteristic Armenoid "sugar-loafed" outline.

Although the Moslems are shorter in the length of the head than the Bedawins, the former exceed the latter in the total length of the face as well as in the upper face height. Again we find the great disproportion between the upper facial length and height of the lower jaw. The relationship of breadth of face to its total length is 88 per cent which may be classified as leptoprosopic on the border of mesoprosopism. The nose is a little longer and a little broader than among the Bedawins, and the nasal index may be said to be leptorrhine on the border of mesorrhiny. The Moslem mouths are wider than are those of the Bedawins, but the lips are distinctly thinner. There is no significant difference between the two groups in ear length.

If we rapidly summarize the differences between the Moslems and the Bedawins we find that the former are taller in stature, more brachycephalic, higher in the cranial vault, lower and more sloping in the forehead and broader in the forehead and in the distance between the eyes. The antero-posterior contour of the Moslem cranial vault shows a more posterior position of the vertex; the face is broader and longer; the nose is longer and somewhat wider; the mouth has a greater width dimension and the pigmentation is a good deal lighter. If we were in the possession of the nasal profile and nasal height data we could clinch the portrait. In the mind of this writer, however, the direction of these differences presents a picture consistent with what one would expect if the Bedawins were mixed with a fairly strong strain of Armenoid, or what is more properly called by Dr. Henry Field the Iranian Plateau type. It is, therefore, not difficult to postulate that if the necessary nasal data had been recorded, the Moslems would

Table 6. MOSLEM MALES

Measurements, Indices and Observations

Measurements	No.	Range	Mean	S.D.	C.V.
Age	255	18– 74	37.70 ± 0.64	15.10 ± 0.45	40.05 ± 1.20
Stature	240	152–190	168.00 ± 0.24	5.55 ± 0.17	3.30 ± 0.10
Head length	258	164–205	184.98 ± 0.33	7.86 ± 0.23	4.25 ± 0.13
Head breadth	250	132–164	147.28 ± 0.24	5.61 ± 0.17	3.81 ± 0.11
Head height	244	118–157	136.26 ± 0.29	6.72 ± 0.21	4.93 ± 0.15
Min. frontal diam.	258	89–120	104.86 ± 0.20	4.72 ± 0.14	4.50 ± 0.13
Inter-ocular diam.	258	25– 54	31.94 ± 0.13	3.18 ± 0.09	9.96 ± 0.30
Bizygomatic diam.	258	115–154	137.25 ± 0.24	5.80 ± 0.17	4.23 ± 0.13
Physiognomic face ht.	104	151–214	181.34 ± 0.64	9.72 ± 0.45	5.36 ± 0.25
Total face height	258	100–144	120.65 ± 0.30	7.10 ± 0.21	5.88 ± 0.17
Upper face height	258	60– 89	74.60 ± 0.21	5.05 ± 0.15	6.77 ± 0.20
Nose height	258	32– 67	52.98 ± 0.18	4.40 ± 0.13	8.30 ± 0.25
Nose breadth	258	28– 45	36.71 ± 0.12	2.82 ± 0.08	7.68 ± 0.23
Mouth breadth	155	42– 63	52.86 ± 0.18	3.30 ± 0.30	6.24 ± 0.24
Lip thickness	155	4– 23	13.90 ± 0.18	3.26 ± 0.12	23.45 ± 0.90
Ear length, right	136	47– 82	63.30 ± 0.30	5.22 ± 0.21	8.25 ± 0.34
Hand squeeze, right	242	17– 82	41.07 ± 0.36	8.22 ± 0.25	20.01 ± 0.61
Hand squeeze, left	243	17– 70	38.79 ± 0.35	8.13 ± 0.25	20.96 ± 0.64
Indices					
Cephalic Index	258	71– 94	79.74 ± 0.19	4.56 ± 0.14	5.72 ± 0.17
Length-height index	244	61– 90	73.79 ± 0.20	4.71 ± 0.14	6.38 ± 0.19
Breadth-height index	244	79–105	92.45 ± 0.20	4.53 ± 0.14	4.90 ± 0.15
Fronto-parietal index	258	63– 83	71.17 ± 0.14	3.30 ± 0.10	4.64 ± 0.14
Cephalo-facial index	258	85–102	93.20 ± 0.14	3.45 ± 0.10	3.70 ± 0.11
Zygo-frontal index	258	68– 87	76.62 ± 0.14	3.40 ± 0.10	4.44 ± 0.13
Total facial index	258	75–104	88.00 ± 0.23	5.45 ± 0.16	6.19 ± 0.18
Upper facial index	258	43– 66	54.41 ± 0.15	3.66 ± 0.11	6.73 ± 0.20
Nasal index	258	52–107	69.46 ± 0.32	7.64 ± 0.23	11.00 ± 0.33

Observations

Hair Color	No.	%
Black	95	41.85
Dark brown	88	38.77
Brown	7	3.08
Gray	27	11.89
White	10	4.41
Total	227	100.00

Eye Color	No.	%
Dark brown	44	17.53
Brown	138	54.98
Hazel	12	4.78
Green	3	1.20
Olive	1	.40
Gray	30	11.95
Light blue	2	.80
Blue	21	8.37
Total	251	100.01

Skin Color (unexposed)	No.	%
Dark red brown	1	.53
Olive yellow	16	8.47
Yellowish white	51	26.98
Pale white	41	21.69
Ruddy white	1	.53
Light brown	68	35.98
Very light brown	11	5.82
Total	189	100.00

Skin Color (exposed)	No.	%
Dark yellow brown	1	.40
Copper colored	40	16.06
Olive yellow	51	20.48
Yellowish white	21	8.43
Ruddy white	1	.40
Light brown	66	26.51
Very light brown	69	27.71
Total	249	99.99

possess a higher nose than the Bedawins, a more convex nasal profile, more frequent presence of a nasion depression and a greater frequency of recurved alae. The fundamental difference between the Moslems and the Bedawins, then, would be the inclusion in the former of a much stronger admixture of Armenoid-Iranian Plateau stock.

Table 7 records the mean of the measurements and indices of the Moslems broken down into eye color groups. The brown-eyed category is by far the largest, including more than one-half of the entire series (138); the mixed light-eyed class is the next largest with 69 individuals or about 28 per cent of the series; and in contrast to the Bedawins the dark brown-eyed category is the smallest with 44 individuals or 17 per cent of the series.

Table 7. MOSLEM MALES BY EYE COLOR

Measurements	Dark Brown 44	Brown 138	Mixed Light 69
Age	32.45	38.60	40.00
Stature	167.49	168.03	168.33
Head length	186.90	184.86	184.56
Head breadth	147.25	147.31	146.50
Head height	136.06	136.14	136.70
Minimum frontal diameter	104.30	105.30	105.50
Inter-ocular diameter	31.40	32.42	31.52
Physiognomic face height	179.38	182.26	182.22
Bizygomatic diameter	134.75	137.70	138.00
Total face height	120.20	124.60	120.60
Upper face height	73.95	74.60	74.95
Nose height	53.06	53.02	52.82
Nose breadth	35.90	36.74	37.22
Mouth breadth	52.70	53.36	52.28
Lip thickness	15.84	14.08	13.68
Ear length, right	62.28	68.79	64.17
Indices			
Cephalic index	79.08	79.77	79.86
Length-height index	72.68	73.85	74.27
Breadth-height index	92.15	92.30	93.14
Fronto-parietal index	71.08	71.32	71.17
Cephalo-facial index	91.85	93.32	94.04
Zygo-frontal index	77.58	76.54	76.30
Facial index	89.40	87.75	87.35
Upper facial index	54.77	54.35	54.29
Nasal index	68.30	69.50	70.38

If we examine the dark brown-eyed class first we find that in contrast to the other two eye pigment groups, it is the youngest in mean age, the shortest in stature, the longest in head length, intermediate in head breadth, the lowest in head height, the narrowest in minimum frontal diameter and inter-ocular width, the shortest in physiognomic face height, by far the smallest in the width of the face, the shortest in total face height and upper face height, the narrowest in the nose, the thickest in the lips, the lowest in mean cephalic index, the lowest in length-height and breadth-height indices, the narrowest in the forehead relative to the breadth of the head, the narrowest in the face relative to the width of the cranial vault, the highest in zygo-frontal index, the most leptoprosopic, leptene and leptorrhine. The dark brown-eyed group, then, seems to typify most strongly the Mediterranean-Arab element in the Moslem population.

The mixed light-eyed category is the tallest of all the groups, the shortest in length of head, the narrowest in head breadth, the highest in cranial vault elevation, the broadest in forehead width as well as face width, the greatest in upper face height, the shortest in nose height, the broadest in nasal width, the narrowest in mouth breadth and in lip thickness. Indicially, the mixed light-eyed class is the most brachycephalic, the highest in length-height and breadth-height indices, the highest in cephalo-facial index, the lowest in breadth of forehead relative to the width of the face, the least leptoprosopic, leptene and leptorrhine. The evidence is admitted to be somewhat confusing, but it appears that the mixed light-eyed element suggests the presence of a mixed Nordic-Alpine strain with the Alpine stock considerably more predominant than the Nordic. The Alpinoid characters are particularly located in the nose, in the shape of the head and in the breadth of the face, while the Nordic features are represented in the length of the face, light pigment of the eye, the thinness of the lips and the narrower width of the mouth.

The brown-eyed class is particularly outstanding in the width of the head, in the greatest inter-ocular diameter, the longest physiognomic face height, by far the longest total face height, the greatest in mouth breadth and in the length of the ear. This class is also highest in the fronto-parietal index. In all other characters it is intermediate to the dark brown and mixed light-eyed groups. In the latter instances the brown-eyed leans more frequently towards the mixed light-eyed class than to the dark brown category. It seems that what we are dealing with here is a predominance of an Armenoid-Iranian Plateau element. The affinities to the mixed light-eyed characters are due to the possession of the Iranian Plateau stock of many Alpinoid characters.

In conclusion, the population represented by the Moslems of this study seems to be basically Arab-Mediterranean plus a moderately strong Armenoid-Iranian Plateau admixture with the addition of an adulterated Nordic-Alpine stock.

Table 8 presents a comparison of measurements and indices between the Moslems of this study and a number of other Near Eastern groups. A close scrutiny of these data reveals the fact that none of the series tabulated show very close resemblances to the Moslems.[1] Perhaps their nearest in racial affiliation is the Bedawin group. And even the latter when contrasted measurement for measurement with the Moslems present several important differences. The principal disparities already referred to are the possession by the Moslems of greater statures, much shorter

TABLE 8. COMPARISON BETWEEN MOSLEM MALES AND OTHER NEAR EASTERN GROUPS

	Moslems (This Study)	Bedawins (This Study)	Akeydat (Shanklin)[1]	Maualy (Shanklin)[1]	Greek Orthodox (This Study)	Maronites (This Study)	Syrians (Seltzer)[2]
NUMBER	258	115	120	176	91	31	251
Stature	168.00	166.86	168.50	170.12	167.16	167.61	167.19
Head length	184.98	189.09	191.35	190.42	182.70	179.13	183.06
Head breadth	147.28	144.46	146.14	147.06	151.60	151.96	155.47
Head height	136.26	134.50	122.76	125.36	135.10	139.10	127.77
Min. frontal diam.	104.86	103.42	117.64	118.50	104.82	105.46	106.82
Bizygomatic diam.	137.25	135.30	134.58	135.91	137.30	137.00	138.85
Total face height	120.65	119.70	123.32	124.04	118.30	118.95	122.90
Upper face height	74.60	75.05	71.82	73.00	74.65	73.95	72.80
Nose height	52.98	52.70	54.66	55.42	53.10	51.58	55.22
Nose breadth	36.71	36.41	36.28	36.82	35.36	36.74	34.76
Cephalic index	79.74	76.29	76.39	77.28	83.01	84.96	85.11
Length-height index	73.79	71.09	64.15[3]	65.83[3]	74.21	77.90	69.92
Breadth-height index	92.45	93.14	84.00[3]	85.24[3]	89.39	91.79	82.43
Fronto-parietal index	71.17	71.56	80.50[3]	80.58[3]	69.43	69.61	68.80
Cephalo-facial index	93.20	93.65	92.09[3]	93.00	90.56	89.87	89.57
Zygo-frontal index	76.62	76.66	87.41[3]	87.19[3]	76.86	77.38	76.94
Total facial index	88.00	88.60	91.90	92.34	86.65	87.30	88.58
Upper facial index	54.41	54.74	53.40	53.80	54.32	54.44	52.61
Nasal index	69.46	69.46	65.95	66.26	67.10	71.82	63.26

[1] Shanklin, 1936. [2] Seltzer, 1936. [3] Index of means.

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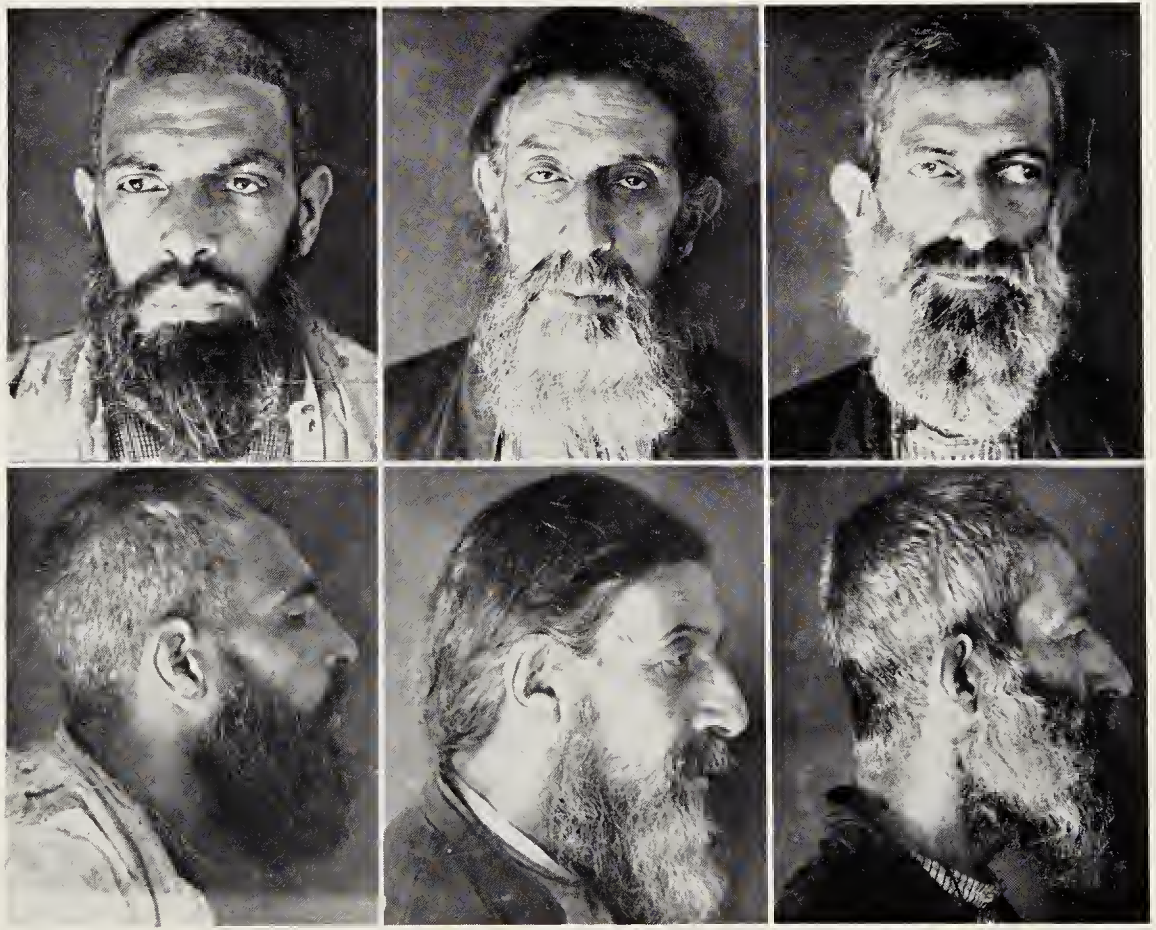
[1] This Moslem series seems to show very close resemblance with Shanklin's group of Mhardeh Syrians. See "The Journal of the Royal Anthropological Institute of Great Britain and Ireland." vol. LXVIII, pp. 379–414. London, 1938. Unfortunately this manuscript had already gone to proof after the appearance of Shanklin's excellent anthropometric study making it impossible to include this new material.

head lengths, considerably broader head breadths, higher cranial vaults, somewhat broader foreheads and faces, and slightly longer noses, total and upper facial heights. Although it is true that the main element in the Moslems as in the Bedawins is the Mediterranean-Arab stock, the former have a moderately strong Armenoid-Iranian Plateau strain which in the Bedawins is of very minor importance.

In the main, the differences between the Moslems and the Bedawins are accentuated when the former are compared with Shanklin's Akeydat and Maualy. Both of Shanklin's groups have more Mediterranean-Arab elements and less of the Armenoid-Iranian Plateau than is found in the Moslems.

Compared to the Greek Orthodox series the Moslems are possibly taller in stature, much more dolichocephalic, somewhat higher headed, similar in frontal and bizygomatic diameter, more leptoprosopic but less leptorrhine. Thus the Mediterranean-Arab element which is dominant in the Moslems becomes of secondary importance among the Greek Orthodox group. On the other hand the Armenoid-Iranian Plateau strain which is of secondary importance in the Moslems rises to primary significance in the Greek Orthodox group.

Both the Maronite and Syrian series differ from the Moslems in the possession of significantly greater proportions of Armenoid-Iranian Plateau strains.



SAMARITANS

THE SAMARITANS OF THE NEAR EAST

The Samaritans of Palestine are physically a most extraordinary group of people. They present a multitude of characters which stamp them as one of the most distinctive ethnic elements in the Near East. Our series consists of 38 adult males between the ages of 18 and 69. The average age of the series is 37.65 years. Most fortunately full face and profile view photographs are available for almost every individual in the group. Owing to their excellence we have taken the liberty of drawing quite heavily upon them for descriptive material. After examining and studying these photographs it was found that as many as 25 seemed to group themselves together in showing striking resemblances in cranial and facial features as well as in general expression. It is this group of 25 which presents the distinctive features of the Samaritans. These may be termed the "Ultra-Samaritans." The remaining 10 or 12 diverge quite markedly from the above subgroup and appear to be simply the general run of physical type so characteristic of the coastal Syrian. Accordingly the descriptive remarks to follow, based on the photographic material, will refer particularly to the features of the "Ultra-Samaritan" subgroup.

Skin color among the Samaritans is unusually light for a Near Eastern population, with every single individual classified for the unexposed parts as either pale white or yellowish white; the former color is almost three times as common as the latter. It is also significant to note that the tanning differential is exceedingly small, since none of the individuals display any brown or reddish brown skins on the exposed parts of the body. From the photographs it appears that the form of the head hair is either straight or of the low wave variety, at least in those cases where the hair is not clipped too short. Face hair is very abundant and widely distributed over the upper parts of the cheeks. There are, however, a few cases where the beard is extremely sparse and of the general Arab variety with slight development on lips and chin and spotty on the side of the face. There seems to be no middle ground as far as beard development is concerned, in as much as the face hair is either extremely abundant or extremely sparse. The eyebrows are on the whole very thick and heavy and concurrency is

TABLE 9. SAMARITAN MALES

MEASUREMENTS, INDICES AND OBSERVATIONS

MEASUREMENTS	No.	Range	Mean	S.D.	C.V.
Age	38	18– 69	37.65±1.71	15.65±1.21	41.57±3.22
Stature	38	161–184	172.26±0.75	6.81±0.53	3.95±0.31
Head length	38	170–202	188.28±0.88	8.04±0.62	4.27±0.33
Head breadth	38	135–158	146.17±0.56	5.13±0.40	3.51±0.27
Head height	38	130–161	140.22±0.73	6.68±0.52	4.76±0.37
Min. frontal diam.	38	97–116	103.54±0.53	4.84±0.37	4.67±0.36
Inter-ocular diam.	38	25– 36	29.87±0.24	2.19±0.17	7.33±0.57
Bizygomatic diam.	38	120–149	132.15±0.63	5.80±0.45	4.39±0.34
Physiognomic face ht.	30	155–202	182.50±1.16	9.40±0.82	5.15±0.45
Total face height	38	105–144	123.95±0.71	6.45±0.50	5.20±0.40
Upper face height	38	70– 94	78.95±0.51	4.70±0.36	5.95±0.46
Nose height	38	44– 63	55.38±0.45	4.08±0.32	7.37±0.57
Nose breadth	38	28– 42	36.74±0.32	2.88±0.22	7.84±0.61
Mouth breadth	38	46– 59	51.40±0.31	2.86±0.22	5.56±0.43
Lip thickness	38	10– 29	17.24±0.35	3.18±0.25	18.45±1.43
Ear length, right	38	53– 76	64.98±0.49	4.47±0.35	6.88±0.53
Hand squeeze, right	38	17– 64	32.91±1.11	10.11±0.78	30.72±2.38
Hand squeeze, left	38	17– 58	30.63±0.94	8.61±0.67	28.11±2.17
INDICES					
Cephalic index	38	71– 88	77.91±0.42	3.81±0.29	4.89±0.38
Length-height index	38	67– 81	74.39±0.34	3.09±0.24	4.15±0.32
Breadth-height index	38	85–111	95.72±0.55	5.04±0.39	5.27±0.41
Fronto-parietal index	38	66– 77	70.96±0.27	2.49±0.19	3.51±0.27
Cephalo-facial index	38	82– 96	90.35±0.29	2.64±0.20	2.92±0.23
Zygo-frontal index	38	72– 87	78.22±0.32	2.88±0.22	3.68±0.28
Total facial index	38	80–109	94.65±0.68	6.25±0.48	6.60±0.51
Upper facial index	38	52– 72	59.96±0.48	4.35±0.34	7.25±0.56
Nasal index	38	52– 83	66.54±0.83	7.60±0.59	11.42±0.88

OBSERVATIONS

Hair Color	No.	%
Blonde	1	2.63
Brown	6	15.79
Dark brown	15	39.47
Black	6	15.79
Gray	4	10.53
Gray and brown	1	2.63
Gray and dark br.	3	7.89
Gray and black	2	5.26
Total	38	99.99

Eye Color	No.	%
Dark brown	11	28.95
Brown	13	34.21
Hazel	3	7.89
Gray	3	7.89
Gray and brown	1	2.63
Blue	7	18.42
Total	38	99.99

Skin Color (unexposed)	No.	%
Yellowish white	9	23.68
Pale white	29	76.32
Total	38	100.00

Skin Color (exposed)	No.	%
Olive yellow	15	39.47
Yellowish white	14	36.84
Pale white	6	15.79
Ruddy white	2	5.26
Ruddy +yel. white	1	2.63
Total	38	99.99

often visible. Pronouncedly heavy brow ridges are an almost characteristic feature of the Samaritans. Eye color among the Samaritans is quite heterogeneous. Mixed light eyes are found in 36.83 per cent of the males; about half of this number are classified as blue. Brown eyes comprise 34.21 per cent of the series and the dark brown variety only 28.95 per cent. Eyefolds are almost entirely lacking among the Samaritans with the exception of two or three cases of external epicanthic, or Nordic, folds of medium development. The height of the palpebral opening is in many instances quite pronounced, and there are a number of cases where the sclera is visible below the inferior border of the iris. Nasion depression is prevailingly small, and the root of the nose is very high indeed. The Samaritans possess very high and prominent nasal bridges, and the profiles range from pronouncedly convex to the straight type. Concave nasal profiles seem to be entirely lacking in this group. In breadth the root and the bridge of the nose are of moderate dimensions. The nasal tip is rather fleshy, but depressed nasal tips are not predominant although often present. Recurved alae are, however, a very common feature. The Samaritans have rather heavy lips which show a medium degree of eversion. The chin is characteristically extremely weak and lacking in frontal protrusion causing the profile to fall away very markedly below the mouth. Ears are on the whole very large and stand away quite strongly from the side of the head. All degrees of forehead slope may be seen in this series of Samaritans ranging from the extremely sloping variety to the high bulging type. The cranial vault is extraordinarily high and the "sugar-loaf" form or Armenoid type of cranial contour with the vertex towards the occiput is very common in this group.

If we turn to the metric and indicial characters we find that, according to Table 9, the Samaritans are rather tall in stature with a mean of 172.26 centimeters. The glabello-occipital length is moderate and the breadth across the parietals is not very great. The height of the cranial vault with a mean of 140.22 millimeters is truly a remarkable character. In relative proportions the cranial vault is on the border of mesocephaly and dolichocephaly, extremely hysicephalic and acrocephalic. Forehead breadth among the Samaritans is unusually narrow with a mean minimum frontal diameter of 103.54 mm. Facial breadth is also extremely small both in absolute dimensions and in relative proportions, as evidenced by the low cephalo-facial index of 90.35 and the mean zygo-frontal index of 78.22.

The length of the face from the hairline to menton is very great, while the nasion-menton height mean of 123.95 is but of moderate size. The mean total facial index of 94.65 characterizes the Samaritans as one of the most leptoprosopic, if not perhaps the most leptoprosopic, group in the Near East. In consonance with this feature the upper facial proportions are most remarkably hyper-leptene. The nose is distinctly long and moderately broad giving a mean leptorrhine nasal index of 66.54.

Again it must be frankly stated by this writer that it appears to be quite possible that our observer may have erred in the location of the nasal point. From a close examination of the photographs, as well as from other considerations, it seems that face height and nose height measurements have been underestimated. Although the present figures give the Samaritans a leptorrhine nose and a leptoprosopic face, photographically they appear to show a hyper-leptorrhine nose and a hyper-leptoprosopic face.

The breadth of the mouth is not very great among the Samaritans, but the thickness of the lips is extremely marked with a mean of 17.24 millimeters. And finally, the length of the ear (64.98 mm.) is of more than moderate dimensions considering the mean age of the group.

It is quite obvious that the small size of the Samaritan series precludes the possibility of obtaining reliable analysis sortings for clues to the identification and linkage of the racial elements present. Accordingly the simple eye color sortings given in Table 10 can only be considered in the light of suggestions rather than in the form of definitive evidence. The light mixed eye color group consisting of 14 individuals seems to exhibit the shortest head length, the narrowest minimum frontal diameter, the longest face, the greatest nose height, the longest ear and the most leptorrhine nasal index. The dark brown-eyed group is possibly the shortest in stature, the most dolichocephalic, the most acrocephalic, the narrowest in facial breadth and the shortest in ear length. The brown-eyed class is the most brachycephalic, the greatest in forehead breadth, the greatest in facial breadth, the shortest in face height and nose height, the least leptorrhine and the least leptoprosopic.

There is little doubt from the examination of the metric data as well as the photographs that the basic element in the Samaritans is that of the Iranian Plateau stock. This is evidenced in part by the extreme nasality, the extraordinary height of the cranial vault, the sugar-loafed contour of the head and by the great length of the face. From the above eye color sortings it seems to be at any event suggestive that this element entered the group along with a Nordic strain accentuating its leptorrhiny and its leptoprosopy. The second racial element of importance is the so-called Atlanto-Mediterranean. The dark brown-eyed class perhaps shows this element in its greatest strength but even here it is intimately associated with Iranian Plateau characteristics. The third element, and of lesser significance, is the Alpine strain. This seems to be clearly linked with the brown-eyed class in its brachy-

TABLE 10. SAMARITAN MALES BY EYE COLOR

MEASUREMENTS	Dark Brown 11	Brown 13	Light mixed 14
Age	41.55	29.30	42.35
Stature	171.54	172.86	172.29
Head length	190.35	189.24	185.79
Head breadth	145.00	148.95	145.00
Head height	140.94	140.42	139.50
Minimum frontal diameter	103.58	106.50	100.78
Inter-ocular diameter	30.08	29.69	29.87
Bizygomatic diameter	131.10	133.15	132.00
Physiognomic face height	183.30	179.18	184.50
Total face height	123.80	121.60	126.30
Upper face height	80.20	77.40	79.50
Nose height	56.06	52.90	57.22
Nose breadth	37.46	37.07	35.87
Mouth breadth	52.50	51.58	50.78
Lip thickness	17.78	17.88	16.22
Ear length, right	63.50	64.38	66.42
INDICES			
Cephalic index	76.35	78.93	78.21
Length-height index	73.73	74.00	75.29
Breadth-height index	97.19	94.31	95.21
Fronto-parietal index	71.35	72.07	69.58
Cephalo-facial index	90.92	89.46	90.71
Zygo-frontal index	78.26	79.66	76.94
Total facial index	94.75	92.75	96.30
Upper facial index	61.19	58.07	60.71
Nasal index	66.70	69.18	63.22

TABLE 11. COMPARISON BETWEEN SAMARITAN MALES AND OTHER NEAR EASTERN GROUPS

	Samaritans (This Study)	Bedawins (This Study)	Akeydat (Shanklin)[1]	Maualy (Shanklin)[1]	Moslems (This Study)	Turkomans (This Study)	Maronites (This Study)	Nusairiyeh (This Study)	Druse (This Study)
Number	38	115	120	176	258	19	31	25	46
Stature	172.26	166.86	168.50	170.12	168.00	169.74	167.61	169.68	167.55
Head length	188.28	189.09	191.35	190.42	189.48	191.04	179.13	176.16	178.89
Head breadth	146.17	144.46	146.14	147.06	147.28	143.89	151.96	152.56	151.72
Head height	140.22	134.50	122.76	125.36	136.26	136.54	139.10	138.84	138.90
Min. frontal diam.	103.54	103.42	117.64	118.50	104.86	104.62	105.46	105.86	106.94
Bizygomatic diam.	132.15	135.30	134.58	135.91	137.25	135.70	137.00	139.00	140.70
Total face height	123.95	119.70	123.32	124.04	120.65	120.40	118.95	124.00	120.35
Upper face height	78.95	74.05	71.82	73.00	74.60	75.25	73.95	76.00	73.65
Nose height	55.38	52.70	54.66	55.42	52.98	54.14	51.58	54.94	53.06
Nose breadth	36.74	36.41	36.28	36.82	36.71	35.78	36.74	35.84	36.77
Cephalic index	77.91	76.29	76.39	77.28	79.74	75.33	84.96	86.52	84.84
Length-height index	74.39	71.09	64.15[2]	65.85[2]	73.79	71.15	77.90	79.28	77.60
Breadth-height index	95.72	93.14	84.0[2]	85.24[2]	92.45	95.78	91.79	91.16	91.79
Fronto-parietal index	70.96	71.56	80.50[2]	80.58[2]	71.15	72.37	69.61	69.76	70.45
Cephalo-facial index	90.35	93.65	92.09[2]	93.0[2]	93.20	95.15	89.87	91.52	92.72
Zygo-frontal index	78.22	76.66	87.41[2]	87.19[2]	76.62	76.22	77.38	76.38	76.02
Total facial index	94.65	88.60	91.90	92.34	88.00	87.80	87.30	89.40	85.60
Upper facial index	59.96	54.74	53.4	53.8	54.41	55.37	54.44	54.68	52.61
Nasal index	66.54	69.46	65.95	66.26	69.46	66.14	71.82	64.86	70.54

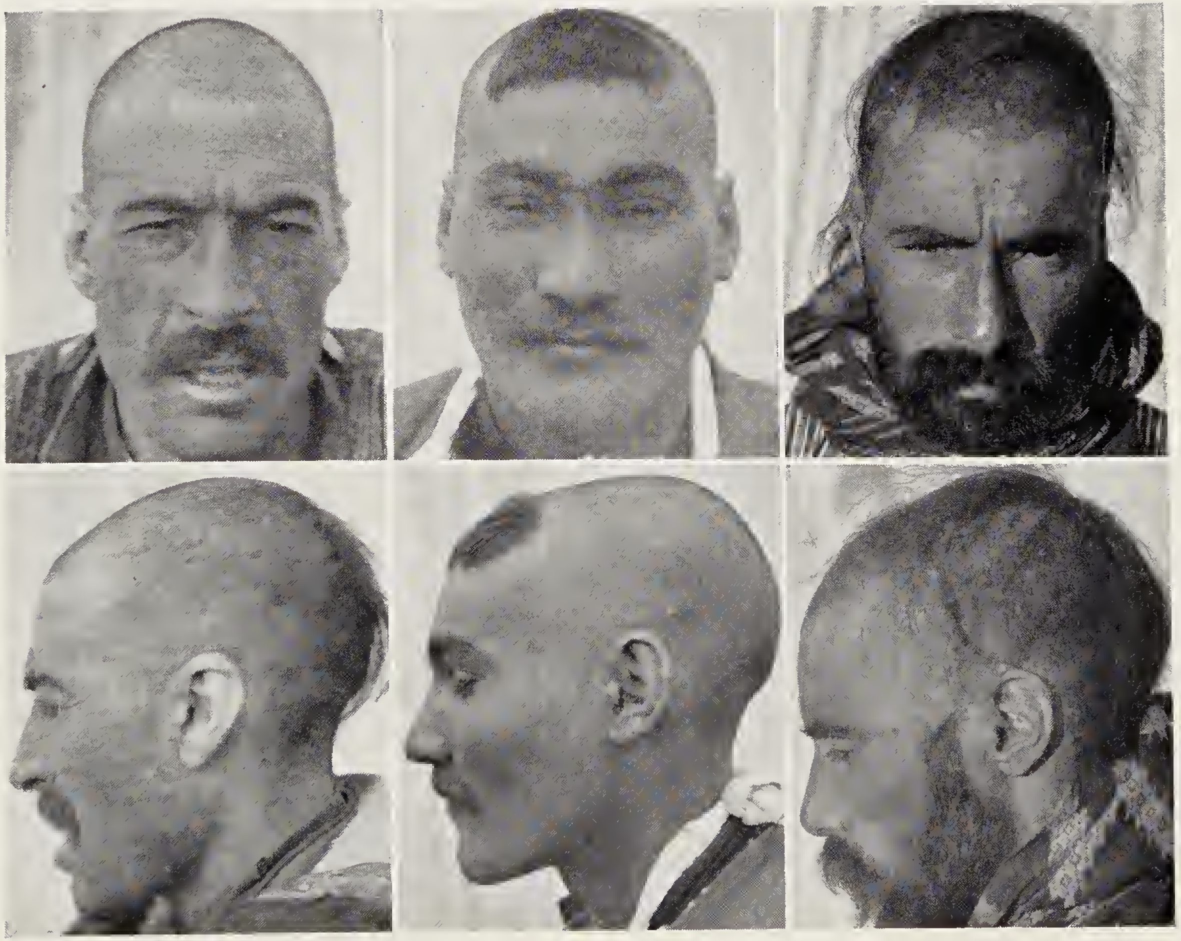
[1] Shanklin, 1936.

[2] Index of means.

cephaly, its greater lateral dimensions of head and face, in its tendency towards mesoprosopy and in its weaker leptorrhiny. Although this Alpine strain is present to some extent in the group which we earlier designated photographically as the "Ultra-Samaritans," it is undoubtedly most strongly represented in the small residual "non-Samaritan" group.

A close survey of the data in Table 11 shows that the Samaritans differ very markedly from the Maronites, Nusairiyeh and Druse series. These groups are hyperbrachycephalic in contrast to the Samaritans who present a low mesocephalic cranial vault. This brachycephaly is due in the Maronites and Druse to the very strong elements of Alpine as well as Armenoid-Iranian Plateau blood. The Alpine strain is particularly of very minor significance among the Samaritans.

There is also no close relationship between the Samaritans and the Bedawins, Akeydat, Maualy, Moslems and Turkomans. In the latter groups the dominant element in varying strength is the Mediterranean-Arab strain, while in the Samaritans the significant stock is the Iranian Plateau. The Samaritans do possess strong Mediterranean blood, but whereas in the afore-mentioned groups it is Arab-Mediterranean, in the Samaritans it is the Atlanto-Mediterranean.



TURKOMANS

THE TURKOMANS OF THE NEAR EAST

Our Turkoman male series contains only 19 individuals of adult age. Sufficient homogeneity of features, however, is present to enable us to describe and characterize the group with a fair degree of confidence. Of considerable assistance in this task are the photographs of 11 out of the 19 men of the series, which contain both profile and frontal views of the head and face. The form of the head hair is in part obscured by the practice of head shaving among these people, so that only small tufts of hair remain on the frontal or occipital aspects. Whatever evidence is available in the case of this feature seems to point to possession by the Turkomans of head hair which is straight in form with possibly the suggestion of a slight low wave in one or two of the individuals in the series. The color of the head hair is described as black in 68.42 per cent of the group and dark brown in the remaining 31.58 per cent. Mustaches are always present and well developed, but the amount of face hair varies from sparse to pronounced beard development. About three-fourths of the group possess unexposed skin colors containing a yellowish base classified as either olive yellow or yellowish white, while approximately 15 per cent have copper colored skins and the remaining 10 per cent are dark yellow brown in color. The eyebrows are moderately thick and concurrency seems to be present in quite a few cases. The color of the eyes is either dark brown or brown in almost 80 per cent of the individuals in this series; the rest are either hazel, gray or blue. External eyefolds are not uncommon but internal epicanthic folds seem to be entirely lacking. The nose in general lacks unusual characteristics and is in root and bridge merely of moderate dimensions. The wings of the nostrils are not particularly flaring and the nasal tip is not thick and heavy. The tip of the nose is directed upward in almost every instance and the lateral as well as the frontal visibility of the nostrils, is quite marked. It may be seen then that the characteristic Iranian Plateau-Armenoid nose is virtually absent.

Metrically the Turkomans are moderately tall in stature, have long heads and distinctly narrow head widths. The mean cephalic index of 75.33 places these people in the dolichocephalic class. The

Table 12. TURKOMAN MALES

Measurements, Indices and Observations

Measurements	No.	Range	Mean	S.D.	C.V.
Age	17	18– 59	32.90±1.73	10.60±1.23	32.22±3.73
Stature	19	164–187	169.74±0.78	5.07±0.55	2.99±0.33
Head length	19	185–202	191.04±0.75	4.86±0.53	2.54±0.28
Head breadth	19	135–155	143.89±0.80	5.16±0.56	3.59±0.39
Head height	19	122–153	136.54±1.02	6.60±0.72	4.83±0.53
Min. frontal diam.	19	97–112	104.62±0.65	4.20±0.46	4.01±0.44
Inter-ocular diam.	19	28– 36	32.48±0.27	1.74±0.19	5.36±0.59
Bizygomatic diam.	19	125–144	135.70±0.78	5.05±0.55	3.72±0.41
Physiognomic face ht.	15	159–202	181.58±1.45	8.32±1.02	4.58±0.56
Total face height	19	110–134	120.40±0.84	5.40±0.59	4.48±0.49
Upper face height	19	65– 84	75.25±0.77	5.00±0.55	6.64±0.73
Nose height	19	44– 63	54.14±0.73	4.72±0.52	8.72±0.95
Nose breadth	19	31– 42	35.78±0.33	2.13±0.23	5.95±0.65
Mouth breadth	19	48– 59	52.72±0.40	2.58±0.28	4.89±0.54
Lip thickness	19	8– 19	13.02±0.41	2.66±0.29	20.43±2.24
Ear length, right	19	56– 73	64.74±0.65	4.17±0.46	6.44±0.70
Hand squeeze, right	19	14– 49	36.00±1.37	8.88±0.97	24.67±2.70
Hand squeeze, left	19	14– 49	34.41±1.14	7.38±0.81	21.45±2.35
Indices					
Cephalic index	19	68– 82	75.33±0.58	3.75±0.41	4.98±0.54
Length-height index	19	64– 81	71.15±0.59	3.84±0.42	5.40±0.59
Breadth-height index	19	88–105	95.78±0.65	4.23±0.46	4.42±0.48
Fronto-parietal index	19	66– 77	72.37±0.41	2.67±0.29	3.69±0.40
Cephalo-facial index	19	88–102	95.15±0.49	3.15±0.34	3.31±0.36
Zygo-frontal index	19	68– 83	76.22±0.54	3.48±0.38	4.57±0.50
Total facial index	19	80– 99	87.80±0.63	4.05±0.44	4.61±0.50
Upper facial index	19	46– 63	55.37±0.56	3.60±0.39	6.50±0.71
Nasal index	19	52– 75	66.14±0.84	5.40±0.59	8.16±0.89

Observations

Hair Color	No.	%
Dark brown	6	31.58
Black	13	68.42
Total	19	100.00

Eye Color	No.	%
Dark brown	4	21.05
Brown	11	57.89
Hazel	1	5.26
Gray	2	10.53
Blue	1	5.26
Total	19	99.99

Skin Color (unexposed)	No.	%
Dark yellow brown	2	10.53
Copper colored	3	15.79
Olive yellow	9	47.37
Yellowish white	5	26.32
Total	19	100.01

Skin color (exposed)	No.	%
Copper colored	5	27.78
Olive yellow	11	61.11
Ruddy white	2	11.11
Total	18	100.00

height of the cranial vault is well developed, giving decidedly acrocephalic and hypsicephalic proportions to the general form of the head. From the photographs it appears that the forehead is rather high and rounded and that the occipital region shows marked protrusion in many instances. In one or two individuals there is a characteristic Mongoloid fatty deposit on the cheeks.

The minimum frontal diameter is small and the face is quite narrow with a mean bizygomatic diameter of 135.70 millimeters. The length of the face is merely moderate in both total facial and physiognomic heights. The total facial index of 87.80 is on the border of leptoprosopism and mesoprosopism. The upper facial length, however, is quite marked and the corresponding upper facial index is decidedly leptene. The nose is of moderate length as well as of moderate breadth. The mean nasal index of 66.14 is leptorrhine. The mouth is not unusually broad and the lips are medium in thickness and, according to the photographs, show no marked eversion.

Table 13. TURKOMAN FEMALES

Measurements, Indices and Observations

Measurements	No.	Range	Mean	Female Mean as a Percentage of Male Mean
Age	6	20– 64	44.50	..
Stature	6	140–157	152.49	89.8
Head length	6	170–187	180.00	94.2
Head breadth	6	129–146	135.01	93.8
Head height	6	118–137	124.82	91.4
Minimum frontal diameter	6	93–104	99.82	95.4
Inter-ocular diameter	6	25– 36	31.01	95.5
Bizygomatic diameter	6	120–134	126.15	93.0
Physiognomic face height	6	163–182	168.50	92.8
Total face height	6	105–114	109.50	91.0
Upper face height	6	65– 74	70.35	93.5
Nose height	6	44– 55	49.50	91.4
Nose breadth	6	28– 36	32.51	90.9
Mouth breadth	6	48– 53	50.50	95.8
Lip thickness	6	8– 13	11.16	85.7
Ear length, right	6	53– 67	59.01	91.1
Indices				
Cephalic index	6	71– 85	75.51	100.0
Length-height index	6	72– 76	74.33	104.5
Breadth-height index	6	85– 96	91.49	95.5
Fronto-parietal index	6	72– 77	74.50	102.9
Cephalo-facial index	6	88– 96	92.00	96.7
Zygo-frontal index	6	76– 83	78.82	103.4
Total facial index	6	80– 89	85.35	97.2
Upper facial index	6	52– 60	56.51	102.1
Nasal index	6	52– 71	64.82	98.0

Observations

Eye Color	No.	%
Dark brown	2	33.33
Brown	4	66.67
Totals	6	100.00

The size of the female Turkoman series is too small to be of any significance, since there are only 6 individuals in the group. The means of the measurements and indices, nevertheless, are presented in Table 13 for what they are worth. Surprisingly, however, in spite of the extreme smallness of the series, the females approximate the male Turkomans very closely in general characteristics. The females have almost the identical cephalic index as the males, are relatively shorter and lower in skull vault dimensions, broader in the forehead relative to the width of the face, and, although shorter and broader in total facial proportions, they are longer and narrower in the upper facial region.

With respect to the racial origin of our series of Turkomans much can be said with confidence. The predominantly dark pigmentation, the moderate stature, the dolichocephalic skull vault, the narrow forehead and face, the leptorrhine non-Armenoid nose, et cetera, are features which clearly point to a diagnosis of Mediterranean-Arab racial stock. There is also present in this group a very slight admixture of Armenoid-Iranian Plateau blood which is visible in the great height of the cranial vault, in the marked length of the upper face and in the occasional appearance of the typical Armenoid nose. In addition there is also a trace of some kind of mixed Nordic blood which may very possibly have come in along with the Armenoid-Iranian Plateau admixture. The possibility of a very slight amount of Mongoloid admixture must also be considered in the light of the appearance in a few instances of certain characteristic fatty deposits in the cheeks. The Turkomans then, are overwhelmingly Mediterranean-Arab in racial origin, with a slight admixture of Armenoid-Iranian Plateau, plus a trace of some mixed Nordic stock.

In comparative Table 14 it may be seen that the Turkomans show very close resemblances with several of the groups tabulated. Attention has already been called to the close affiliation between the Turkomans and the Bedawins. Their difference, it may be remembered, may be attributed to the possession by the Turkomans of a stronger Iranian Plateau strain than in the Bedawins. Similarly the Akeydat and Maualy are not so strong as the Turkomans in the Iranian Plateau elements.

Coon's Riffian Arabs[1] are very similar to the Turkomans in many features. Particular mention in this connection should be made of the close agreement in minimum frontal diameter, bizygomatic diameter, total face height (when differences in technique are taken into account), nose breadth, cephalic index, fronto-parietal index and zygo-frontal index. This strong resemblance is, of course, due to their possession in common of a strong element of Mediterranean-Arab blood.

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[1] Coon, 1931.

TABLE 14. COMPARISON BETWEEN TURKOMAN MALES AND OTHER NEAR EASTERN GROUPS

	Turkomans (This Study)	Bedawins (This Study)	Akeydat (Shanklin)[1]	Maualy (Shanklin)[1]	Rwala (Shanklin)[2]	Mesopotamian Arabs (Ehrich)[3]	Riffian Arabs (Coon)[4]
NUMBER	19	115	120	176	270	33	93
Stature	169.74	166.86	168.50	170.12	161.9	171.28	167.98
Head length	191.04	189.09	191.35	190.42	191	190.44	194.33
Head breadth	143.89	144.46	146.14	147.06	144	146.21	145.13
Head height	136.54	134.50	122.76	125.36	..	..	127.66
Min. frontal diam.	104.62	103.42	117.64	118.50	104	104.15	104.54
Bizygomatic diam.	135.70	135.30	134.58	135.91	130	137.73	135.14
Total face height	120.40	119.70	123.32	124.04	119	128.67	123.37
Upper face height	75.25	74.05	71.82	73.00	70	79.09	72.12
Nose height	54.14	52.70	54.66	55.42	55	58.52	53.86
Nose breadth	35.78	36.41	36.28	36.82	35	35.39	35.47
Cephalic index	75.33	76.29	76.39	77.28	75.0	76.25	74.64
Length-height index	71.15	71.09	64.15[5]	65.83[5]	..	..	65.63
Breadth-height index	95.78	93.14	84.00[5]	85.24[5]	..	..	88.02
Fronto-parietal index	72.37	71.56	80.50[5]	80.58[5]	72.22[5]	71.21	72.00
Cephalo-facial index	95.15	93.65	92.09[5]	93.00[5]	90.28[5]	94.21	93.06
Zygo-frontal index	76.22	76.66	87.41[5]	87.19[5]	80.00[5]	74.88	77.36[5]
Total facial index	87.80	88.60	91.90	92.34	91.7	93.36	91.33
Upper facial index	55.37	54.74	53.4	53.8	53.9	57.42	53.36
Nasal index	66.14	69.46	65.95	66.26	63.7	60.73	66.29

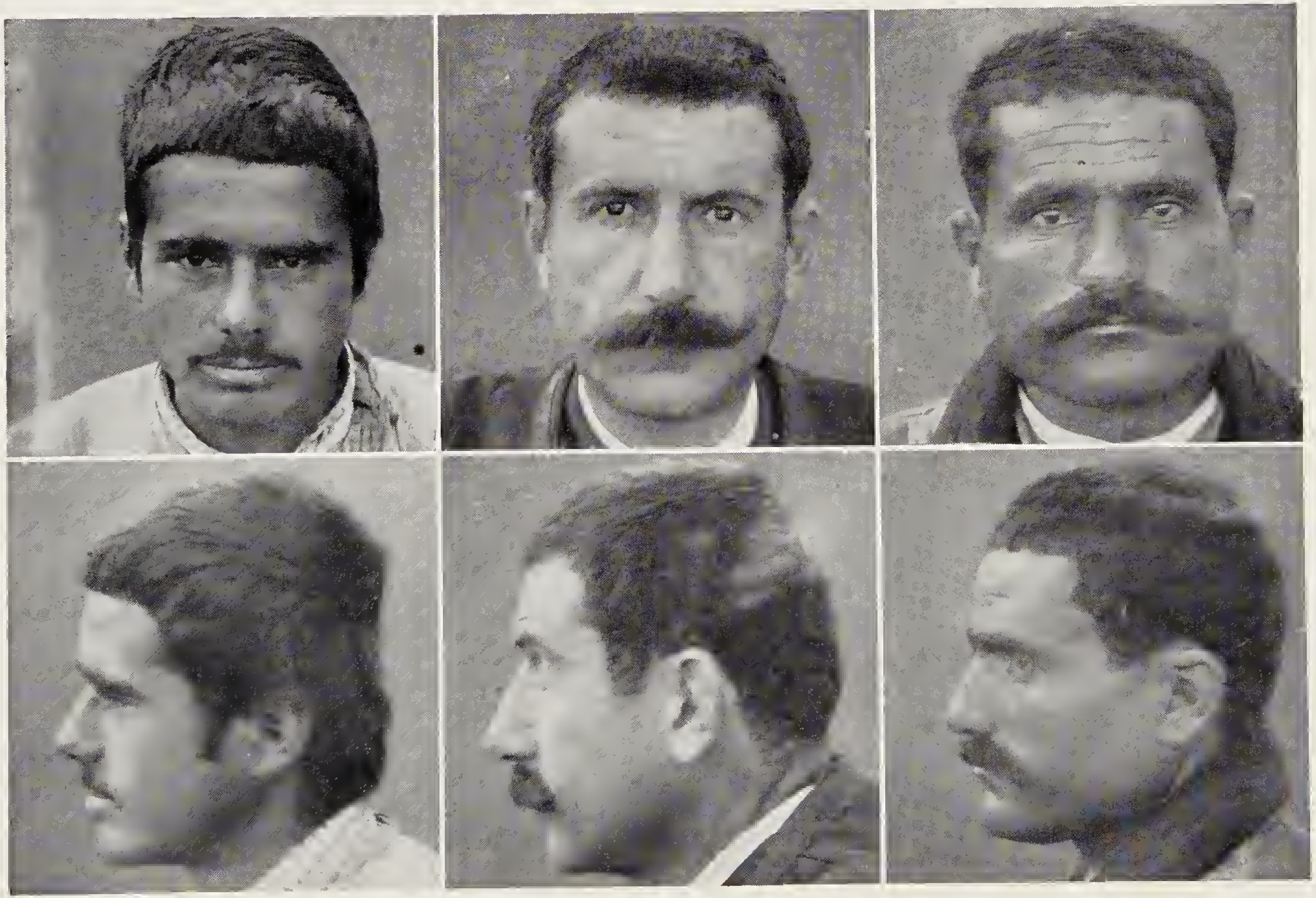
[1] Shanklin, 1936.

[2] Shanklin, 1935.

[3] Ehrich, unpublished measurements in the Peabody Museum.

[4] Coon, 1931.

[5] Index of means.



MARONITES

THE MARONITES OF THE NEAR EAST

The Maronite male series consists of 31 individuals whose average age is 28.95 years. The color of the skin taken on the unexposed regions is moderately dark for this Near East group. The predominant colors are light brown (42.31 per cent) and copper colored (38.46). The remainder of the population shows very small proportions of dark yellow brown skin, reddish white and very light brown skins. There is a complete absence of light-colored head hair in this group and the greatest number of individuals have either dark brown or black hair on the scalp. The former color is slightly in excess of the latter. Eye color is quite variable. Brown eyes are most common and include about 42 per cent of the members of the series. The eye color of the rest of the group is about equally divided between the dark brown and the mixed-light categories.

In standing height the Maronites are only moderately tall with a mean of 167.61 centimeters. In head length they are distinctly short and in cranial width quite broad. The shape of the head is very round, or brachycephalic, with a mean length-breadth index of 84.96. The cranial vault is greatly elevated not only in absolute dimensions but also in relation to the length and breadth diameters. The Maronites are not excessively wide in the forehead or in the face, but these lateral dimensions are greater than in the Samaritans, Bedawins and Turkomans. The fronto-parietal index of 69.61 is rather low and indicates a narrow forehead in relation to the width of the face. The mean cephalo-facial index of 89.87 is the lowest of all our Near Eastern groups presented in this paper and may be said to be indicative of a relatively narrow face when considered in the light of the bi-parietal breadth.

The length of the face from the hairline to the chin is on the moderate side, with a mean of 181.18 millimeters. The nasion-menton face height, however, is distinctly on the short side (118.95 mm.). In total facial proportions the Maronites are mesprosopic with strong leanings towards leptoprosopism. The nose is not very long and is moderate in width. The relative proportion of these dimensions, as indicated by the nasal index of 71.82, is indicative of a mesorrhine nasal condition. The breadth of the

TABLE 15. MARONITE MALES

MEASUREMENTS, INDICES AND OBSERVATIONS

MEASUREMENTS	No.	Range	Mean	S.D.	C.V.
Age	31	18– 54	28.95±1.36	11.20±0.96	38.69±3.31
Stature	31	155–184	167.61±0.78	6.45±0.55	3.85±0.33
Head length	31	164–193	179.13±0.61	5.01±0.43	2.80±0.24
Head breadth	31	141–164	151.96±0.66	5.46±0.47	3.59±0.31
Head height	30	126–161	139.10±0.86	6.96±0.61	5.00±0.44
Min. frontal diam.	31	97–116	105.46±0.49	4.04±0.35	3.83±0.33
Inter-ocular diam.	31	25– 36	30.83±0.32	2.61±0.22	8.47±0.73
Bizygomatic diam.	31	125–154	137.00±0.65	5.40±0.46	3.94±0.34
Physiognomic face ht.	24	163–202	181.18±1.23	8.92±0.87	4.92±0.48
Total face height	31	100–134	118.95±0.87	7.15±0.61	6.01±0.51
Upper face height	31	65– 89	73.95±0.59	4.85±0.42	6.56±0.56
Nose height	31	40– 63	51.58±0.49	4.04±0.35	7.83±0.67
Nose breadth	31	31– 42	36.74±0.34	2.82±0.24	7.68±0.66
Mouth breadth	28	42– 57	49.58±0.45	3.52±0.32	7.10±0.64
Lip thickness	28	6– 19	13.28±0.40	3.10±0.28	23.34±2.10
Ear length, right	25	56– 76	63.96±0.53	3.96±0.38	6.19±0.59
Hand squeeze, right	31	28– 58	43.05±1.03	8.52±0.73	19.79±1.70
Hand squeeze, left	31	22– 52	36.85±0.96	7.89±0.68	21.41±1.83
INDICES					
Cephalic index	31	74– 94	84.96±0.47	3.84±0.33	4.52±0.39
Length-height index	30	70– 90	77.90±0.53	4.32±0.38	5.55±0.48
Breadth-height index	30	82–105	91.79±0.60	4.86±0.42	5.29±0.46
Fronto-parietal index	31	60– 77	69.61±0.43	3.54±0.30	5.09±0.44
Cephalo-facial index	31	79– 99	89.87±0.50	4.11±0.35	4.57±0.39
Zygo-frontal index	31	68– 87	77.38±0.48	4.00±0.34	5.17±0.44
Total facial index	31	70–109	87.30±0.83	6.85±0.59	7.85±0.67
Upper facial index	31	46– 69	54.44±0.59	4.83±0.41	8.87±0.76
Nasal index	31	52– 95	71.82±1.03	8.48±0.73	11.81±1.01

OBSERVATIONS

Hair Color	No.	%
Black	13	41.94
Dark brown	16	51.61
Chestnut	1	3.23
Gray	1	3.23
Total	31	100.01

Eye Color	No.	%
Dark brown	9	29.03
Brown	13	41.94
Hazel	2	6.45
Gray	5	16.13
Blue	2	6.45
Total	31	100.00

Skin Color (unexposed)	No.	%
Dark yellow brown	2	7.69
Copper colored	10	38.46
Reddish white	1	3.85
Light brown	11	42.31
Very light brown	2	7.69
Total	26	100.00

Skin Color (exposed)	No.	%
Copper colored	3	13.04
Dark yellow brown	7	30.43
Yellowish white	1	4.35
Pale white	1	4.35
Ruddy white	1	4.35
Light brown	7	30.43
Light red brown	1	4.35
Very light brown	2	8.70
Total	23	100.00

mouth is interestingly enough narrower than any of the other groups in this study with a mean diameter of 49.85 millimeters. The lips are on the thin side, while the ear lengths in this comparatively young group are excessively great.

TABLE 16. MARONITE FEMALES

MEASUREMENTS, INDICES AND OBSERVATIONS

MEASUREMENTS	No.	Range	Mean	S.D.	C.V.	Female Mean as a Percentage of Male Mean
e	26	18– 69	32.75±1.67	12.65±1.18	38.78±3.63	..
ture	19	143–169	155.85±0.93	6.03±0.66	3.87±0.42	93.0
ad length	26	164–190	176.43±0.80	6.06±0.57	3.43±0.32	98.5
ad breadth	26	132–158	144.31±0.83	6.30±0.59	4.37±0.41	95.0
ad height	23	122–145	132.90±0.82	5.84±0.58	4.39±0.44	95.6
n. frontal diam.	26	85–116	101.74±0.75	5.64±0.53	5.54±0.52	96.5
er-ocular diam.	26	25– 36	30.86±0.36	2.76±0.26	8.94±0.84	100.0
ygomatic diam.	26	115–144	128.75±0.78	5.90±0.55	4.58±0.43	94.0
ysiognomic face ht.	13	159–186	170.98±1.48	7.92±1.05	4.63±0.61	94.4
tal face height	26	95–124	111.40±0.89	6.75±0.63	6.06±0.57	93.7
per face height	26	65– 79	70.45±0.44	3.30±0.31	4.68±0.44	95.3
se height	26	40– 59	49.61±0.43	3.24±0.30	6.52±0.61	96.3
se breadth	26	28– 39	32.93±0.33	2.46±0.23	7.47±0.70	89.6
uth breadth	13	42– 53	49.26±0.70	3.74±0.49	7.59±1.00	99.4
thickness	13	8– 17	13.26±0.48	2.56±0.34	19.31±2.55	99.8
r length, right	13	50– 76	60.24±1.04	5.58±0.74	9.26±1.22	94.2
INDICES						
phalic index	26	74– 91	81.81±0.66	4.98±0.47	6.09±0.57	96.3
ngth-height index	23	67– 87	75.56±0.58	4.14±0.41	5.48±0.54	97.0
eadth-height index	23	79–114	92.39±0.96	6.81±0.68	7.37±0.73	100.7
onto-parietal index	26	63– 77	70.36±0.40	3.03±0.28	4.31±0.40	101.1
phalo-facial index	26	85– 99	89.57±0.33	2.49±0.23	2.78±0.26	99.7
go-frontal index	26	68– 87	79.18±0.44	3.36±0.31	4.24±0.40	102.3
tal facial index	26	75–104	86.40±0.89	6.70±0.63	7.75±0.72	99.0
per facial index	26	46– 66	55.07±0.52	3.96±0.37	7.19±0.67	101.2
sal index	26	56– 83	66.26±0.76	5.76±0.54	8.69±0.81	92.3

OBSERVATIONS

Eye Color	No.	%
Dark brown	5	19.23
Brown	14	53.85
Gray	4	15.38
Blue	2	7.69
Light blue	1	3.85
Total	26	100.00

Table 16 contains the statistical data relative to the physical characteristics of 26 Maronite women who have an average age of 32.75 years. It may be seen that, with very few exceptions, this female series shows approximately the same features as the male group. They are moderate in stature, short headed, broad headed, high in the cranial vault, moderately broad in the forehead, moderate in physiognomic face height, but short in total facial height, moderately short in the nose and long in the ears. They differ from the male series to a greater extent than is to be attributed to the sex factor in showing a considerably more dolichocephalic skull vault, in presenting approximately the same inter-ocular diameter, in the marked narrowness of the nose and in the more leptorrhine nasal index.

Owing to the small size of the male Maronite series we are unable to attempt an eye color sorting as an aid in the racial diagnosis of the various elements of the group. A very close examination of the anthropometric data, nevertheless, with the assistance of a few photographs allows certain deductions to be made with a reasonable degree of confidence. The most salient fact is that the most dominant racial element among the Maronites is the Alpine. This is visible in part in the brachycephaly of the group, in the width of the face, in the mesoprosopic facial proportions, in the tendency towards mesorrhiny and in the low frequency of Armenoid nasal appendages. On top of this basic Alpine is a strain of Iranian Plateau or perhaps a mixed Armenoid-Iranian Plateau element. And finally there is a suggestion of a small admixture of Mediterranean and some highly miscegenized Nordic or East Baltic blood.

From the data in Table 17 it may be seen that there is an extremely close relationship between the Maronites and the Druse group. In the following characteristics the two series are very close: stature, head length, head breadth, head height, upper face height, nose breadth, cephalic index, length-height index, breadth-height index and fronto-parietal index. They show small differences in minimum frontal diameter with the Maronites presenting the narrower mean, in bizygomatic diameter where again the Maronites possess the inferior measurement, in nose height with the Druse having the longer nose, in cephalo-facial index with the Maronites displaying narrower faces relative to the width of the head, in the more leptoprosopic and leptene facial indices of the Maronites, and in the somewhat more leptorrhine nasal proportions of the Druse. Of these features only bizygomatic diameter and cephalo-facial index show statistically significant differences (differences greater than three times the probable error of the difference). Other significant differences not listed in this comparative table may be found for inter-ocular diameter and mouth breadth, with the Maronites having the smaller dimensions. We have already seen that the Maronites are predominantly Alpine and Iranian Plateau in racial derivation. It must follow then that the Druse are also predominantly Alpine and Iranian Plateau. Their difference may possibly lie in the possession by the Druse of a somewhat stronger Alpine element than in the Maronites. This may be seen in the greater bizygomatic diameter and the larger minimum frontal diameter of the Druse group.

Table 17. COMPARISON BETWEEN MARONITE MALES AND OTHER NEAR EASTERN GROUPS

	Maronites (This Study)	Druse (This Study)	Nusairiyeh (This Study)	Greek Orthodox (This Study)	Syrians (Seltzer)[1]	Armenians (Seltzer)[1]	Alouites (Shanklin)[2]
Number	31	46	25	91	251	101	263
Stature	167.61	167.55	169.68	167.16	167.19	166.16	166.6
Head length	179.13	178.89	176.16	182.70	183.06	184.30	178
Head breadth	151.96	151.72	152.56	151.60	155.47	157.90	149
Head height	139.10	138.90	138.84	135.10	127.77	127.24	125
Min. frontal diam.	105.46	106.94	105.86	104.82	106.82	107.75	110
Bizygomatic diam.	137.00	140.70	139.00	137.30	138.85	142.84	135
Total face height	118.95	120.35	124.00	118.30	122.90	127.96	122
Upper face height	73.95	73.65	76.00	74.65	72.80	76.61	71
Nose height	51.58	53.06	54.94	53.10	55.22	59.93	54
Nose breadth	36.74	36.77	35.84	35.36	34.76	37.96	35
Cephalic index	84.96	84.88	86.52	83.01	85.11	85.81	83.8
Length-height index	77.90	77.60	79.28	74.21	69.92	69.04	70.2[3]
Breadth-height index	91.79	91.79	91.16	89.39	82.43	80.63	83.9[3]
Fronto-parietal index	69.61	70.45	69.76	69.43	68.80	68.24	73.8[3]
Cephalo-facial index	89.87	92.72	91.52	90.56	89.57	90.33	90.6[3]
Zygo-frontal index	77.38	76.02	76.38	76.86	76.94	75.61	81.5[3]
Total facial index	87.30	85.60	89.40	86.65	88.58	89.74	90.8
Upper facial index	54.44	52.61	54.68	54.32	52.61	53.67	52.6[3]
Nasal index	71.82	70.54	64.86	67.10	63.26	63.80	65.0

[1] Seltzer, 1936. [2] Shanklin and Izzeddin, 1937. [3] Index of means.

A comparison between the Maronites and the Nusairiyeh reveals the fact that the former are longer and narrower headed, narrower faced, shorter faced and more mesorrhine. These fundamental differences between the two groups are attributable to the greater relative proportion of Armenoid-Iranian Plateau stock in the Nusairiyeh.

The Greek Orthodox series is less brachycephalic than the Maronites, much lower headed, narrower in the forehead, longer in the upper face height and nose height and smaller in nose width. Certain of these disparities appear to be the result of the presence of a larger Mediterranean element among the Greek Orthodox than in the Maronites. Particular attention in this respect should be directed to the considerably lower cranial vault, the narrower forehead, the longer cranial length and the smaller nasal width of the Greek Orthodox group.

Shanklin's Alouites[1] are not markedly divergent from our Maronites. If we take into account all the differences which are the result of technique of measurement, we find that the Maronites are slightly taller than the Alouites, somewhat longer and broader headed, somewhat broader in the face and wider in the nose. We can only guess about the other measurements, but it is not beyond reasonable probability that they are pretty much alike in the other features listed in the comparative table.

[1] Shanklin and Izzeddin, 1937.

Table 18 contains the metrical and morphological data on 46 adult Druse men. The average age for this group is 34.85 years. With respect to hair color, the Druse men may be said to be dark with about 90 per cent of the group showing either black or dark brown hair, the remaining 10 per cent being either gray or white. Eye color, however, is variable among the Druse with approximately 40 per cent with some form of mixed light eyes, 58.70 per cent with eyes classified as brown, and only 2.17 per cent of the series with dark brown eyes. Unexposed skin color was not observed for this group, but observations on the exposed parts of the body show skins which are almost invariably light brown (97.78 per cent).

The Druse are moderate in stature with a mean of 167.55 centimeters. In head length these people are decidedly short with a mean of 178.89 millimeters. They are also distinctly broad headed and high headed. The mean cephalic index of 84.84 characterizes this group as very brachycephalic. The mean length-height and breadth-height indices classify the Druse as relatively short and high headed, and broad and high headed.

The forehead is moderately broad with a mean of 106.94, while the inter-ocular diameter which expresses the distance between the eyes is quite wide. The face across the zygomatic arches is of considerable breadth, and its length from nasion to menton is slightly on the short side. The mean facial index of 85.60 for the Druse men is mesoprosopic leaning in the euryprosopic direction. The upper facial height is of good dimension, and the upper facial index of 52.61 is between the mesene and leptene classes. The nose is fairly long and not very wide. The mean nasal index of 70.54 is a mesorrhine index bordering on leptorrhiny.

In Table 19 the Druse series is divided on the basis of eye color into two groups, brown and mixed light. There was only one individual with dark brown eyes, while 27 men form the brown-eyed class and 18 the mixed light-eyed category. The two eye color groups show marked differences between them in both metric and indicial characters. In comparison to the mixed light-eyed group, the brown-eyed class is considerably taller in stature (2.46

Table 18. DRUSE MALES

Measurements, Indices and Observations

Measurements	No.	Range	Mean	S.D.	C.V.
Age	46	18– 74	34.85 ± 1.29	12.95 ± 0.91	37.16 ± 2.61
Stature	46	152–184	167.55 ± 0.60	6.06 ± 0.43	3.62 ± 0.25
Head length	46	164–190	178.89 ± 0.56	5.64 ± 0.40	3.15 ± 0.22
Head breadth	46	135–167	151.72 ± 0.53	5.37 ± 0.38	3.54 ± 0.25
Head height	46	126–161	138.90 ± 0.66	6.68 ± 0.47	4.81 ± 0.34
Min. frontal diam.	46	97–116	106.94 ± 0.40	4.00 ± 0.28	3.74 ± 0.26
Inter-ocular diam.	46	28– 45	32.78 ± 0.29	2.94 ± 0.21	8.97 ± 0.63
Bizygomatic diam.	46	130–159	140.70 ± 0.50	5.05 ± 0.36	3.59 ± 0.25
Total face height	46	100–139	120.35 ± 0.64	6.45 ± 0.45	5.36 ± 0.38
Upper face height	46	65– 84	73.65 ± 0.45	4.55 ± 0.32	6.18 ± 0.43
Nose height	46	44– 67	53.06 ± 0.49	4.96 ± 0.35	9.35 ± 0.66
Nose breadth	46	28– 48	36.77 ± 0.34	3.45 ± 0.24	9.38 ± 0.66
Mouth breadth	41	44– 63	53.20 ± 0.36	3.44 ± 0.26	6.47 ± 0.48
Lip thickness	41	6– 25	13.24 ± 0.37	3.52 ± 0.26	26.59 ± 1.98
Hand squeeze, right	46	26– 61	42.99 ± 0.69	6.96 ± 0.49	16.19 ± 1.14
Hand squeeze, left	46	20– 58	41.34 ± 0.79	7.98 ± 0.56	19.30 ± 1.36
Indices					
Cephalic index	46	74–100	84.84 ± 0.46	4.62 ± 0.32	5.45 ± 0.38
Length-height index	46	70– 87	77.60 ± 0.29	2.91 ± 0.20	3.75 ± 0.26
Breadth-height index	46	82–105	91.79 ± 0.43	4.35 ± 0.31	4.74 ± 0.33
Fronto-parietal index	46	63– 77	70.45 ± 0.28	2.79 ± 0.20	3.96 ± 0.28
Cephalo-facial index	46	85–105	92.72 ± 0.35	3.54 ± 0.25	3.82 ± 0.27
Zygo-frontal index	46	68– 83	76.02 ± 0.33	3.28 ± 0.23	4.31 ± 0.30
Facial index	46	70– 99	85.60 ± 0.50	5.05 ± 0.36	5.90 ± 0.41
Upper facial index	46	43– 60	52.61 ± 0.36	3.66 ± 0.26	6.96 ± 0.49
Nasal index	46	48– 99	70.54 ± 1.01	10.20 ± 0.72	14.46 ± 1.02

Observations

Hair Color	No.	%
Black	30	76.92
Brown	5	12.82
Gray	3	7.69
White	1	2.56
Total	39	99.99

Eye Color	No.	%
Dark brown	1	2.17
Brown	27	58.70
Green	1	2.17
Olive	1	2.17
Gray	9	19.57
Blue	7	15.22
Total	46	100.00

Skin Color (exposed)	No.	%
Light brown	44	97.78
Light red br.	1	2.22
Total	45	100.00

cm.), shorter headed and broader headed, higher in the cranial vault, broader in the forehead, approximately the same in interocular and bizygomatic breadth, distinctly longer in the total facial height dimension and in the upper face height segment, longer and narrower in the nose and thicker in the lips. Indicially, the brown-eyed class is more brachycephalic, higher in the length-height index of the cranial vault, lower in the breadth-height index, narrower faced relative to the width of the head, broader in the forehead in relation to the facial breadth, more leptoprosopic, more leptene and more leptorrhine.

It would appear then that the brown-eyed group leans more strongly towards the Armenoid-Iranian Plateau type than does the mixed light-eyed category. The Alpine element is ineradicably bound up with both the brown-eyed and mixed light-eyed classes. The shortness of stature, and of facial length in the latter group suggests an East Baltic strain rather than some mixed Nordic stock. Like the Maronites, the Druse are predominantly Alpine and Iranian Plateau in racial derivation, with the Alpine element probably in excess. Additional racial stocks present, but in slight quantities only, are the Mediterranean and East Baltic.

TABLE 19. DRUSE MALES BY EYE COLOR

MEASUREMENTS	Brown 27	Mixed Light 18
Age	35.35	34.50
Stature	168.45	165.99
Head length	177.66	180.66
Head breadth	152.23	150.82
Head height	139.78	137.74
Minimum frontal diameter	107.26	106.94
Inter-ocular diameter	32.66	32.66
Bizygomatic diameter	140.90	140.60
Total face height	121.05	118.65
Upper face height	74.20	72.30
Nose height	53.22	52.62
Nose breadth	36.56	37.01
Mouth breadth	53.90	54.62
Lip thickness	13.20	12.62
INDICES		
Cephalic index	85.68	84.00
Length-height index	78.32	77.16
Breadth-height index	91.79	92.00
Fronto-parietal index	70.57	70.66
Cephalo-facial index	92.45	93.32
Zygo-frontal index	76.18	75.94
Total facial index	85.90	84.50
Upper facial index	53.12	51.83
Nasal index	70.10	71.50

Table 20 compares the means and measurements of the Druse males with those of several other Near Eastern groups. The most intimate relationship is, of course, with the Maronites. Their similarities and differences have already been discussed in detail, and the conclusion noted that the disparities in physical characteristics between the two groups may be accounted for by the greater proportion of Alpine blood among the Druse.

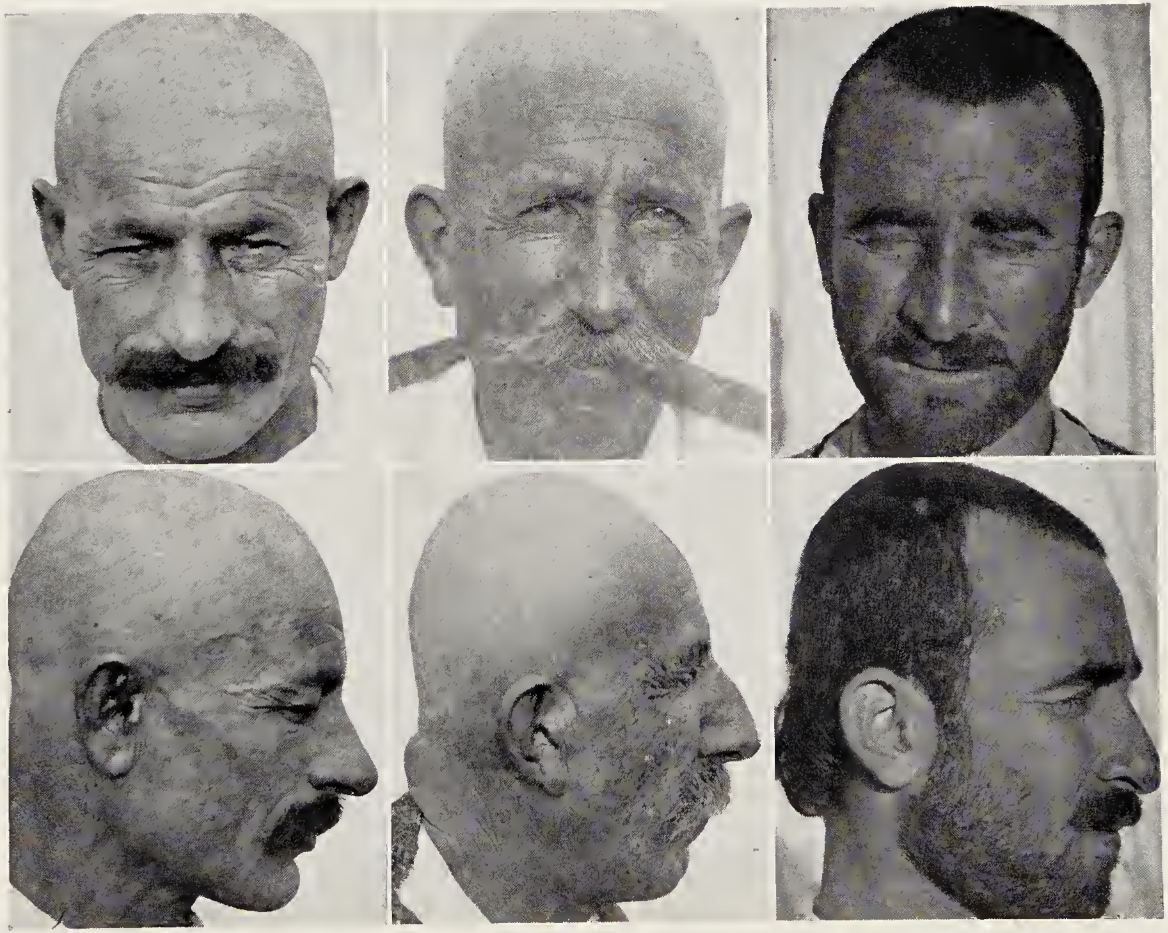
TABLE 20. COMPARISON BETWEEN DRUSE MALES AND OTHER NEAR EASTERN GROUPS

	Druse (This Study)	Bedawins (This Study)	Maronites (This Study)	Nusairiyeh (This Study)	Greek Orthodox (This Study)	Syrians (Seltzer)[1]	Armenians (Seltzer)[1]
Number	46	115	31	25	91	251	101
Stature	167.55	166.86	167.61	169.68	167.16	167.19	166.16
Head length	178.89	189.09	179.13	176.16	182.70	183.06	184.30
Head breadth	151.72	144.46	151.96	152.56	151.60	155.47	157.90
Head height	138.90	134.50	139.10	138.84	135.10	127.77	127.24
Min. frontal diam.	106.94	103.42	105.46	105.86	104.82	106.82	107.75
Bizygomatic diam.	140.70	135.30	137.00	139.00	137.30	138.85	142.84
Total face height	120.35	119.70	118.95	124.00	118.30	122.90	127.96
Upper face height	73.65	74.05	73.95	76.00	74.65	72.80	76.61
Nose height	53.06	52.70	51.58	54.94	53.10	55.22	59.93
Nose breadth	36.77	36.41	36.74	35.84	35.36	34.76	37.96
Cephalic index	84.88	76.29	84.96	86.52	83.01	85.11	85.81
Length-height index	77.60	71.09	77.90	79.28	74.21	69.92	69.04
Breadth-height index	91.79	93.14	91.79	91.16	89.39	82.43	80.63
Fronto-parietal index	70.45	71.56	69.61	69.76	69.43	68.80	68.24
Cephalo-facial index	92.72	93.65	89.87	91.52	90.56	89.57	90.33
Zygo-frontal index	76.02	76.66	77.38	76.38	76.86	76.94	75.61
Total facial index	85.60	88.60	87.30	89.40	86.65	88.58	89.74
Upper facial index	52.61	54.74	54.44	54.68	54.32	52.61	53.67
Nasal index	70.54	69.46	71.82	64.86	67.10	63.26	63.80

[1] Seltzer, 1936.

The Nusairiyeh diverge from the Druse in a number of characteristics. The former are more brachycephalic, somewhat narrower in the forehead and the face, and considerably longer in the facial lengths as well as in the nasal length. These features suggest that compared with the Druse, the Nusairiyeh have a much larger element of Armenoid-Iranian Plateau blood.

Neither the Greek Orthodox series nor the Syrian and Armenian groups show close resemblances to our Druse. The Greek Orthodox are much more Mediterranean than the Druse, while the Syrians are more Alpinoid.



NUSAIRIYEH

THE NUSAIRIYEH OF THE NEAR EAST

The Nusairiyeh series consists of 25 adult males whose average age is calculated to be 34.80 years. This group is highly variable in pigmentation. With respect to eye color we find that almost half of the total number of individuals have some grade of mixed-light eyes. The next largest category is the brown which includes 40 per cent of the series. This is followed by the dark brown-eyed category amounting to but 12 per cent of the total number. Unexposed skin color is very light for a Near Eastern group, with as much as 87.50 per cent of the individuals classified as having pale skin colors and the remainder described as yellowish white. Hair color among the Nusairiyeh is surprisingly enough totally on the dark side. About 40 per cent of the group have black head hair, more than 50 per cent have dark brown hair, and less than 5 per cent have brown hair. From the photographs it appears that the presence of the external, or Nordic fold, is an extremely common feature for these people. Foreheads seem to be extraordinarily high and steep. The noses are narrow in the root and broaden as one approaches the base. The height of the root and bridge of the nose, however, as it projects from the face is extraordinarily developed. The profile seems to be either straight or convex, and a depression of the nasal tip certainly does occur. The sugar-loafed shape of the skull vault, and particularly the occiput, seems to be characteristic of the group. Mustaches appear to be well developed and the chin decidedly on the weak and retrogressive side.

Metrically, the Nusairiyeh are moderate to tall in stature with a mean of 169.68 centimeters. The heads are decidedly short as well as distinctly broad. The mean cephalic index of 86.52 characterizes the Nusairiyeh as hyper-brachycephalic. In head height this group is unusually well developed with a mean of 138.84 millimeters. The minimum frontal diameter is moderate in size, but the inter-ocular diameter with a mean of 30.92 is definitely quite narrow. The fronto-parietal index of 69.76 suggests a relatively narrow forehead as compared with the breadth of the head in the parietal region. The width of the face is not excessive but yet it may be considered to be on the broad side (139.00 mm.).The height of the face from hairline to chin is very great, and the total

TABLE 21. NUSAIRIYEH MALES

MEASUREMENTS, INDICES AND OBSERVATIONS

MEASUREMENTS	No.	Range	Mean	S.D.	C.V.
Age	25	18– 69	34.80 ±1.92	14.20 ±1.35	40.80 ±3.89
Stature	25	152–184	169.68 ±0.91	6.75 ±0.64	3.98 ±0.38
Head length	25	161–187	176.16 ±0.87	6.42 ±0.61	3.64 ±0.35
Head breadth	25	138–164	152.56 ±0.87	6.48 ±0.62	4.25 ±0.41
Head height	25	130–149	138.84 ±0.72	5.36 ±0.51	3.85 ±0.37
Min. frontal diam.	25	93–116	105.86 ±0.64	4.76 ±0.45	4.50 ±0.43
Inter-ocular diam.	25	25– 36	30.92 ±0.34	2.52 ±0.24	8.15 ±0.78
Bizygomatic diam.	25	130–149	139.00 ±0.51	3.75 ±0.36	2.70 ±0.26
Physiognomic face ht.	23	163–218	187.98 ±1.75	12.44 ±1.24	6.62 ±0.66
Total face height	25	110–144	124.00 ±1.09	8.10 ±0.77	6.53 ±0.62
Upper face height	25	65– 89	76.00 ±0.74	5.50 ±0.52	7.24 ±0.69
Nose height	25	44– 67	54.94 ±0.57	4.20 ±0.40	7.64 ±0.73
Nose breadth	25	28– 42	35.84 ±0.37	2.76 ±0.26	7.70 ±0.73
Mouth breadth	25	46– 57	52.26 ±0.38	2.80 ±0.27	5.36 ±0.51
Lip thickness	25	8– 19	13.54 ±0.43	3.16 ±0.30	23.34 ±2.23
Ear length, right	25	56 –73	62.88 ±0.49	3.66 ±0.36	5.82 ±0.56
Hand squeeze, right	25	23– 52	42.48 ±0.94	6.96 ±0.66	16.38 ±1.56
Hand squeeze, left	25	26– 52	39.72 ±0.77	5.70 ±0.54	14.35 ±1.37
INDICES					
Cephalic index	25	77– 97	86.52 ±0.62	4.62 ±0.44	5.34 ±0.51
Length-height index	25	73– 87	79.28 ±0.50	3.72 ±0.35	4.69 ±0.45
Breadth-height index	25	79– 99	91.16 ±0.53	3.93 ±0.37	4.31 ±0.41
Fronto-parietal index	25	63– 77	69.76 ±0.39	2.91 ±0.28	4.17 ±0.40
Cephalo-facial index	25	85– 99	91.52 ±0.44	3.24 ±0.31	3.54 ±0.34
Zygo-frontal index	25	68– 83	76.38 ±0.39	2.88 ±0.27	3.77 ±0.36
Total facial index	25	75–104	89.40 ±0.81	6.00 ±0.57	6.71 ±0.64
Upper facial index	25	46– 66	54.68 ±0.46	3.39 ±0.32	6.20 ±0.59
Nasal index	25	44– 79	64.86 ±0.98	7.28 ±0.69	11.22 ±1.07

OBSERVATIONS

Hair Color	No.	%
Black	9	40.91
Dark brown	12	54.55
Brown	1	4.55
Total	22	100.01

Skin Color (unexposed)		
Yellowish white	3	12.50
Pale	21	87.50
Total	24	100.00

Eye Color		
Dark brown	3	12.00
Brown	10	40.00
Hazel	5	20.00
Gray	2	8.00
Blue	3	12.00
Light blue	2	8.00
Total	25	100.00

(Skin Color exposed)	No.	%
Copper colored	6	24.00
Olive yellow	9	36.00
Yellowish white	9	36.00
Ruddy white	1	4.00
Total	25	100.00

face height from nasion to menton is of more than ordinary length. The total facial index, in spite of the width of the zygomatic arches, falls in the leptoprosopic class. The mean upper facial height of 76.00 is truly unusual in its great length. The nose itself is very long with a mean of 54.94 millimeters and of moderate breadth. The mouth is quite wide and the lips unusually thin. The mean nasal index of 64.86 indicates a very leptorrhine nose, its leptorrhiny being due more to its great length than to any narrowness in the region of the alae.

From the point of view of racial diagnosis, it may be clearly seen that the head is unmistakably ultra-Armenoid. It lacks the narrowness in the bi-parietal region of the typical pure Iranian Plateau cranial vault. The frontal region is, however, similar in dimensions to the more or less pure Iranian Plateau type. The face lacks the width of the Armenoid and Iranian Plateau forms. The nose has the Armenoid and Iranian Plateau length but not its width. It lacks also the marked frequency of the depressed form of nasal tips, the flare of the alae and the great predominance of pronounced convex profiles. The lips are thinner than usually found among the Armenoids and the Iranian Plateau groups, and the eyebrows are thinner and the brow ridge less developed. This much is clear—the predominant element forming the Nusairiyeh is Armenoid and to a lesser extent pure Iranian Plateau. The next strongest element is one which tends towards narrow foreheads, narrow faces, narrow noses and thin lips. It seems highly possible that, inasmuch as a little more than half of the series has some form of mixed light eyes, this element may well be Nordic. Unfortunately the small size of the series prevents us from testing this hypothesis by means of eye color sortings. The Nusairiyeh then is a group of mixed racial forms which seems to be stabilizing itself into a distinctive type. They are predominantly Armenoid and Iranian Plateau with an admixture of Nordic, plus traces of a Mediterranean-Arab strain.

Table 22 compares the Nusairiyeh with Shanklin's Alouites,[1] the Greek Orthodox series of this study, and Seltzer's Syrian and Armenian series.[2] The disparities between the Nusairiyeh and the Alouites are very great even after the differences due to technique of measurement are taken into account. The Nusairiyeh are taller in stature, larger headed, more brachycephalic, broader faced and longer faced than the Alouites.

The Greek Orthodox contrasted against the Nusairiyeh are much longer in head length, shorter in stature, very much lower in head height, narrower in forehead and face and shorter in facial lengths and nasal length. Most of these features may be attributed to the greater Mediterranean element in the Greek Orthodox group. It should be pointed out, however, that the Mediterranean element in the Greek Orthodox group is not the dominant racial strain in its composition.

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[1] Shanklin and Izzeddin, 1937.

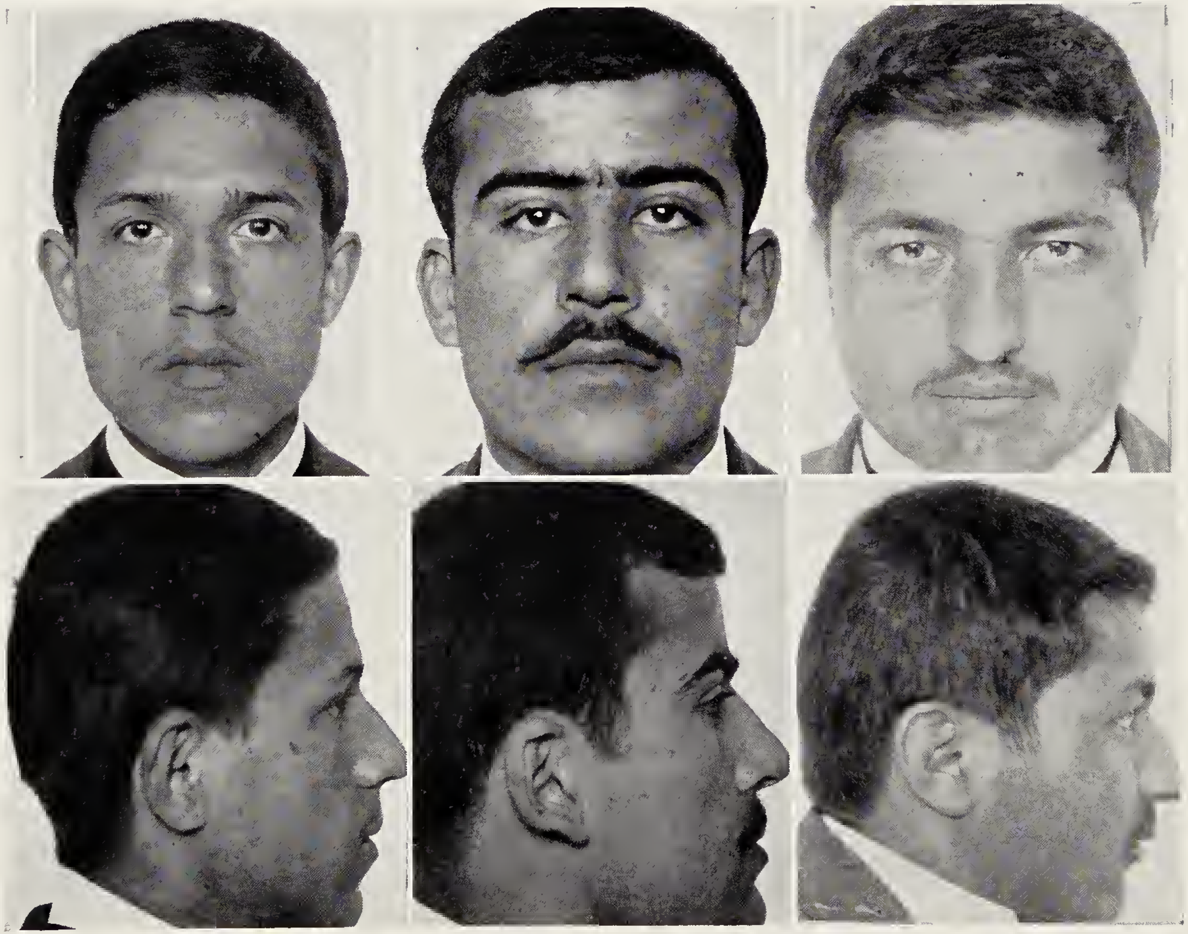
[2] Seltzer, 1936.

TABLE 22. COMPARISON BETWEEN NUSAIRIYEH MALES AND OTHER NEAR EASTERN GROUPS

	Nusairiyeh (This Study)	Alouites (Shanklin)[1]	Greek Orthodox (This Study)	Syrians (Seltzer)[2]	Armenians (Seltzer)[2]
Number	25	263	91	251	101
Stature	169.68	166.6	167.16	167.19	166.16
Head length	176.16	178	182.70	183.06	184.30
Head breadth	152.56	149	151.60	155.47	157.90
Head height	138.84	125	135.10	127.77	127.24
Minimum frontal diameter	105.86	110	104.82	106.82	107.75
Bizygomatic diameter	139.00	135	137.30	138.85	142.84
Total face height	124.00	122	118.30	122.90	127.96
Upper face height	76.00	71	74.65	72.80	76.61
Nose height	54.94	54	53.10	55.22	59.93
Nose breadth	35.84	35	35.36	34.76	37.96
Cephalic index	86.52	83.8	83.01	85.11	85.81
Length-height index	79.28	70.2[3]	74.21	69.92	69.04
Breadth-height index	91.16	83.9[3]	88.39	82.43	80.63
Fronto-parietal index	69.76	73.8[3]	69.43	68.80	68.24
Cephalo-facial index	91.52	90.6[3]	90.56	89.57	90.33
Zygo-frontal index	76.38	81.5[3]	76.86	76.94	75.61
Total facial index	89.40	90.8	86.65	88.58	89.74
Upper facial index	54.68	52.6[3]	54.32	52.61	53.67
Nasal index	64.86	65.0	67.10	63.26	63.80

[1] Shanklin and Izzeddin, 1937. [2] Seltzer, 1936. [3] Index of means.

It is interesting to note that, apart from the length-height and breadth-height indices, the Armenians and the Nusairiyeh are very similar in all the other indicial characters. The differences in length-height and breadth-height indices may be in part the result of differences in technique of measuring the head height diameter.



GREEK ORTHODOX

THE GREEK ORTHODOX OF THE NEAR EAST

This group of heterogeneous peoples confessing the Greek Orthodox faith is 91 in number and averages 26.75 years of age. In hair color they are predominantly dark with 41.76 per cent of the series falling into the black classification. Slightly more frequent is the dark brown variety of hair color, which was recorded in 45.05 per cent. The remainder of the group have chestnut, chestnut and blonde, blonde, and brown hair. Unexposed skin color is light brown in about 42 per cent of the individuals and copper colored in approximately 34 per cent. Eye color among the Greek Orthodox males is quite variable. Somewhat more than one-half of the series display brown eyes, about 30 per cent show eyes classified as mixed-light, and the residuum is characterized by the possession of dark brown eyes (16.09 per cent).

Metrically this group can be considered to have a moderate stature, a short head, but not excessively short, and a rather wide cranial vault. The mean cephalic index of 83.01 is brachycephalic. Out of the 91 individuals in the series as many as 44 have cephalic indices ranging from 83 to 97. Only 8 individuals have cephalic indices 76 and under. The height of the cranial vault is great but is nevertheless considerably below that of the Maronites, Nusairiyeh, Samaritans and Druse. The mean head height amounts to 135.10 millimeters. The forehead is moderate in its breadth as is the distance between the inner palpebral margins of the eyes. The width of the face is not very great. The height of the face from the chin to the hairline is of good dimensions with a mean of 180.54 millimeters. However, the total face height diameter measured from nasion to menton is on the short side with a mean of 118.30 millimeters. The proportions of the face as indicated by the total facial index are definitely mesoprosopic.

The nasal height shows a mean of 53.10 millimeters which exemplifies a nose of considerable length. The breadth of the nose as measured across the alae is not very great, and in fact has a tendency towards narrowness. The relation of the breadth of the nose to its length as expressed by the nasal index averages 67.10 for the Greek Orthodox males, this being a moderately leptorrhine nasal index. The mouth is fairly broad, and the thickness of

Table 23. GREEK ORTHODOX MALES

Measurements, Indices and Observations

Measurements	No.	Range	Mean	S.D.	C.V.
Age	87	18– 64	26.75 ± 0.77	10.60 ± 0.54	39.63 ± 2.03
Stature	88	143–184	167.16 ± 0.47	6.57 ± 0.33	3.93 ± 0.20
Head length	91	164–199	182.70 ± 0.52	7.32 ± 0.37	4.01 ± 0.20
Head breadth	91	135–170	151.60 ± 0.52	7.38 ± 0.37	4.87 ± 0.24
Head height	89	118–153	135.10 ± 0.47	6.52 ± 0.33	4.83 ± 0.24
Min. frontal diam.	91	89–116	104.82 ± 0.33	4.72 ± 0.24	4.50 ± 0.22
Inter-ocular diam.	91	22– 37	31.10 ± 0.27	2.91 ± 0.15	9.36 ± 0.47
Bizygomatic diam.	90	125–154	137.30 ± 0.42	5.85 ± 0.29	4.26 ± 0.21
Physiognomic face ht.	75	155–206	180.54 ± 0.68	8.68 ± 0.48	4.81 ± 0.26
Total face height	90	100–134	118.30 ± 0.44	6.20 ± 0.31	5.24 ± 0.26
Upper face height	90	60– 89	74.65 ± 0.32	4.45 ± 0.22	5.96 ± 0.30
Nose height	90	44– 63	53.10 ± 0.24	3.32 ± 0.17	6.25 ± 0.31
Nose breadth	91	25– 45	35.36 ± 0.20	2.85 ± 0.14	8.06 ± 0.40
Mouth breadth	82	40– 61	51.94 ± 0.28	3.76 ± 0.20	7.24 ± 0.38
Lip thickness	82	4– 23	15.14 ± 0.27	3.62 ± 0.19	23.91 ± 1.26
Ear length, right	82	50– 76	62.19 ± 0.27	3.63 ± 0.19	5.84 ± 0.31
Hand squeeze, right	88	20– 67	43.32 ± 0.67	9.36 ± 0.48	21.61 ± 1.10
Hand squeeze, left	88	17– 61	39.72 ± 0.69	9.60 ± 0.49	24.17 ± 1.23
Indices					
Cephalic index	91	71– 97	83.01 ± 0.38	5.37 ± 0.27	6.47 ± 0.32
Length-height index	89	64– 84	74.21 ± 0.30	4.23 ± 0.21	5.70 ± 0.29
Breadth-height index	89	73–105	89.39 ± 0.41	5.76 ± 0.29	6.44 ± 0.33
Fronto-parietal index	91	60– 80	69.43 ± 0.27	3.87 ± 0.19	5.57 ± 0.28
Cephalo-facial index	90	82– 99	90.56 ± 0.26	3.69 ± 0.19	4.07 ± 0.20
Zygo-frontal index	90	68– 91	76.86 ± 0.27	3.84 ± 0.19	5.00 ± 0.25
Total facial index	90	70–109	86.65 ± 0.43	6.10 ± 0.31	7.04 ± 0.35
Upper facial index	90	43– 63	54.32 ± 0.26	3.69 ± 0.19	6.79 ± 0.34
Nasal index	90	52– 87	67.10 ± 0.46	6.52 ± 0.33	9.72 ± 0.49

Observations

Hair Color	No.	%
Black	38	41.76
Dark brown	41	45.05
Brown	7	7.69
Chestnut	2	2.20
Chestnut + blonde	1	1.10
Blonde	2	2.20
Total	91	100.00

Skin Color (unexposed)		
Dark reddish brown	1	1.19
Copper colored	29	34.52
Dark yellow brown	15	17.86
Light brown	36	42.86
Very light brown	3	3.57
Total	84	100.00

Eye Color		
Dark brown	14	16.09
Brown	47	54.02
Hazel	7	8.05
Green	1	1.16
Green and gray	1	1.16
Gray	5	5.75
Blue	12	13.79
Total	87	100.02

Skin Color (exposed)	No.	%
Copper colored	18	19.78
Light brown	20	21.98
Very light brown	24	26.37
Olive yellow	18	19.78
Yellow white	10	10.99
Pale white	1	1.10
Total	91	100.00

the lips is quite marked with a mean of 15.14 millimeters. The length of the ear is on the long side but nevertheless is shorter than in any of the other groups described in this paper.

The division of the Greek Orthodox males by eye color classes reveals some rather striking differences in metric and indicial characters. In comparison with the brown-eyed and mixed light-eyed groups, the dark brown-eyed class is the shortest in head length, by far the narrowest in head breadth, the lowest by a considerable margin in head height, the greatest in inter-ocular diameter, the narrowest in facial breadth, possibly the longest in total face height, perhaps the shortest in nose height, the narrowest in nasal breadth, the lowest in cephalic index, the lowest in length-height index of the cranial vault, the highest in breadth-height index, the highest in cephalo-facial and zygo-frontal indices, the highest in total facial index and the most leptorrhine.

Table 24. GREEK ORTHODOX MALES BY EYE COLOR

Measurements	Dark Brown 14	Brown 47	Mixed-Light 26
Age	25.45	27.80	25.65
Stature	166.29	168.21	166.38
Head length	181.71	183.27	183.00
Head breadth	147.58	151.57	154.36
Head height	132.66	136.14	135.34
Minimum frontal diameter	105.06	104.62	104.90
Inter-ocular diameter	31.58	31.31	30.00
Bizygomatic diameter	135.95	137.35	138.75
Physiognomic face height	178.78	186.98	178.02
Total face height	119.50	119.15	116.40
Upper face height	74.15	75.80	72.95
Nose height	51.78	54.02	51.98
Nose breadth	34.37	36.02	34.64
Mouth breadth	51.78	51.82	52.84
Lip thickness	15.78	15.58	14.58
Ear length, right	61.87	62.55	61.95
Indices			
Cephalic index	81.21	82.65	84.69
Length-height index	72.92	74.48	74.57
Breadth-height index	90.50	89.99	87.74
Fronto-parietal index	70.21	69.61	67.93
Cephalo-facial index	91.58	90.71	89.48
Zygo-frontal index	77.78	76.54	76.26
Total facial index	87.15	86.80	84.70
Upper facial index	54.29	55.16	52.55
Nasal index	66.34	67.58	67.18

The brown-eyed group, which is by far the largest of the three eye color divisions, is in comparison with the others, the tallest in stature, perhaps the longest in head length, the highest in cranial vault elevation, by far the greatest in physiognomic face height, the greatest in upper face height, again by far the longest in nose height, the broadest in nasal width and the longest in ear length. The brown-eyed men are also the most leptene and possibly the least leptorrhine.

When compared with the dark brown and brown-eyed classes we find that the mixed light-eyed category is outstanding in the breadth of the cranial vault, in the width of the face, in the shortness of the total face height, in the width of the mouth, in the thinness of the lips, in its hyperbrachycephaly, in the lowness of the breadth-height index, in the lowness of the cephalo-facial and zygo-frontal indices, in their mesoprosopism and in their euryene proportion of the upper facial dimensions.

TABLE 25. COMPARISON BETWEEN GREEK ORTHODOX MALES AND OTHER NEAR EASTERN GROUPS

	Greek Orthodox (This Study)	Moslems (This Study)	Syrians (Seltzer)[1]	Armenians (Seltzer)[1]	Turks (Hasluck and Morant)[2]	Nusairiyeh (This Study)
Number	91	258	251	101	200	25
Stature	167.16	168.00	167.19	166.16	167.92	169.68
Head length	182.70	184.98	183.06	184.30	180.93	176.16
Head breadth	151.60	147.28	155.47	157.90	152.65	152.56
Head height	135.10	136.26	127.77	127.24	....	138.84
Min. frontal diam.	104.82	104.86	106.82	107.75	....	105.46
Bizygomatic diam.	137.30	137.25	138.85	142.84	142.28	139.00
Total face height	118.30	120.65	122.90	127.96	124.22	124.00
Upper face height	74.65	74.60	72.80	76.61	....	76.00
Nose height	53.10	52.98	55.22	59.93	53.95	54.94
Nose breadth	35.36	36.71	34.76	37.96	36.65	35.84
Cephalic index	83.01	79.74	85.11	85.81	87.20	86.52
Length-height index	74.21	73.79	69.92	69.04	....	79.28
Breadth-height index	89.39	92.45	82.43	80.63	....	91.16
Fronto-parietal index	69.43	71.17	68.80	68.24	....	69.76
Cephalo-facial index	90.56	93.20	89.57	90.33	90.25	91.52
Zygo-frontal index	76.86	76.62	76.94	75.61	....	76.38
Total facial index	86.65	88.00	88.58	89.74	87.40	89.40
Upper facial index	54.32	54.41	52.61	53.67	....	54.68
Nasal index	67.10	69.46	63.26	63.80	67.20	64.86

[1] Seltzer, 1936. [2] Hasluck and Morant, 1929.

From an analysis of the above data it would appear that the dark brown-eyed class seems to show as an important element in its make-up a strong Mediterranean strain. This is evidenced by the tendency towards dolichocephaly, the lowness of the cranial vault, the narrowness of the face, the shortness of the nose and the narrowness of the nose in absolute dimensions and in relative proportions. The dominant note in the brown-eyed class is undoubtedly the Armenoid-Iranian Plateau stocks. This is seen in the greater size of the cranial vault, in the excessive height of the head above the auditory meatus, particularly in the marked length of the physiognomic face height, in the pronounced upper facial dimension, in the length of the nose and in the greater width of the nose. The characteristics of the mixed light-eyed group are not as clear as for the other two eye color classes. There appears to be in this group some Nordic and East Baltic element, some Alpine and Iranian Plateau, but in what proportions these strains are present it is impossible to say.

In summary then this group of individuals with a common religious bond, the Greek Orthodox church, seems to be a diffuse mixture of Armenoid-Iranian Plateau-Alpine blood, with a somewhat lesser amount of Mediterranean and a definite strain of some sort of Nordic or East Baltic stock.

The Greek Orthodox series when compared with the Moslems reveals striking differences in cranial characters but on the whole is not very dissimilar in facial and nasal features. The Greek Orthodox are somewhat shorter in stature than the Moslems, shorter headed, very much broader headed, and slightly lower in the cranial vault elevation from auditory meati to vertex. They are similar in minimum frontal diameter, bizygomatic diameter, upper face height and nose height. The Greek Orthodox group shows a brachycephalic mean for the length-breadth index of the head, while the Moslems are distinctly mesocephalic. The two groups are not significantly divergent in the length-height index, the zygo-frontal index and the upper facial index, but the Greek Orthodox have lower values in the case of the breadth-height, cephalo-facial, total facial and nasal indices. The Moslems are much more Mediterranean in racial derivation than the Greek Orthodox series, while the latter display considerably more Alpine and Armenoid-Iranian Plateau strains.

The Greek Orthodox do not differ very much from the Syrians and Armenians in stature but show a much shorter and narrower head which is less brachycephalic than the latter groups. The Syrians and Armenians have higher minimum frontal and bizygomatic diameters. If technique of measurement differences is taken into account it is possible that the Syrians have approximately the same total facial length as the Greek Orthodox and that the Armenians have considerably longer faces. In general, the Syrians are closer to the Greek Orthodox series in physical characteristics than the Armenians.

Hasluck's and Morant's[1] series of Turks approximate the Greek Orthodox group in stature and probably in total face height. The former are more brachycephalic, considerably broader faced and somewhat wider in the nose. It would appear then, that the Greek Orthodox group is stronger in Mediterranean elements, and weaker in Alpinoid and possibly Iranian Plateau stocks.

The Nusairiyeh males are taller than the Greek Orthodox, considerably shorter headed, slightly broader headed, more than three index units higher in cephalic index, much higher headed, a little broader in the forehead and in the face, very much more leptoprosopic and leptorrhine. The two groups are principally differentiated in the possession by the Nusairiyeh of a stronger Armenoid-Iranian Plateau element.

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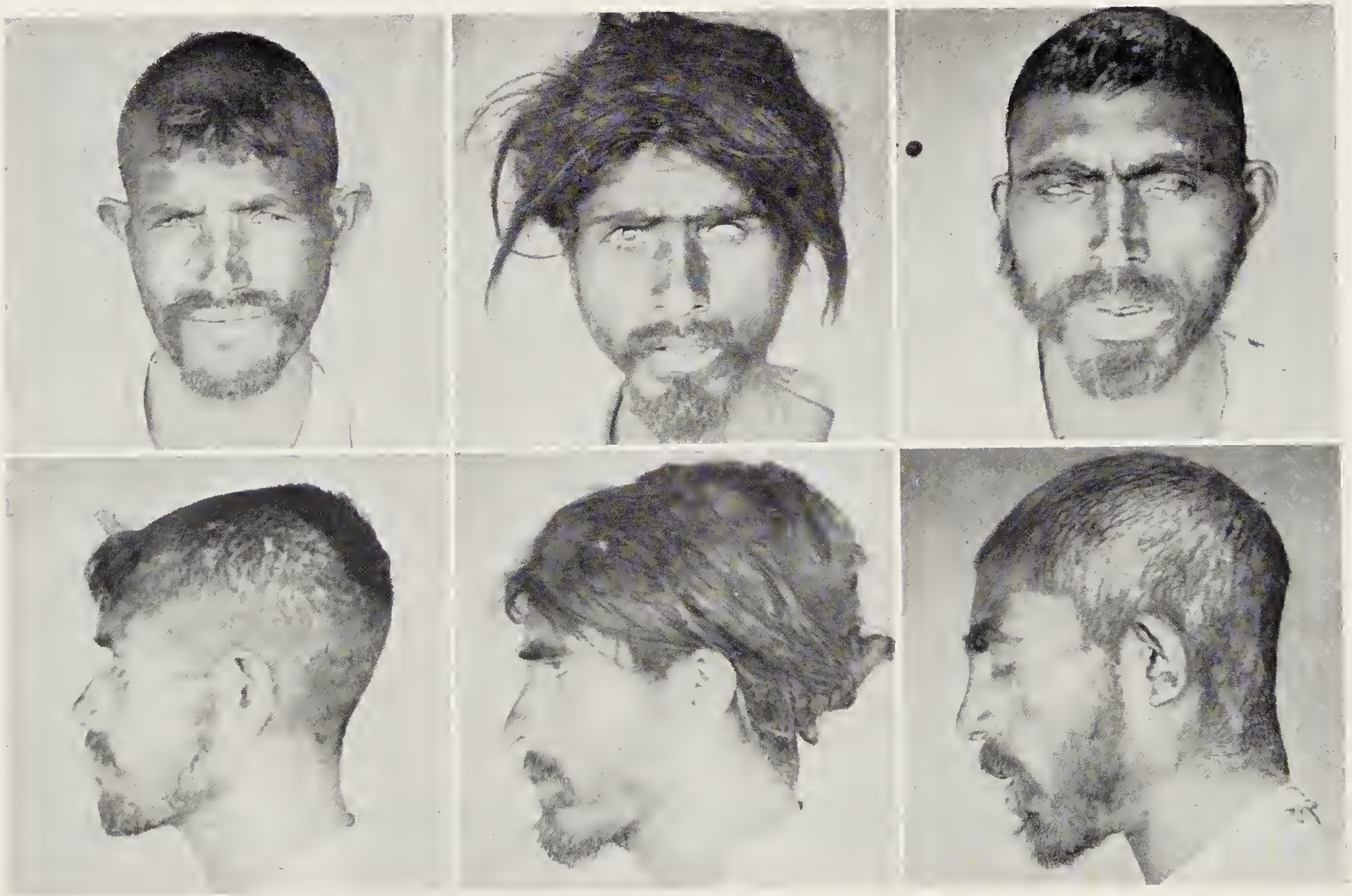
[1] Hasluck and Morant, 1929.



Gypsies

Measurements and photographs were taken on 11 adult male Gypsies. Although we have so very few individuals in the group, their distinctiveness and apparent homogeneity will permit us to make some general remarks as to their physical and racial characteristics. The data for this group of Gypsies are presented in Table 26. Naturally the small size of the series has prevented us from calculating constants of variability and sampling errors of any value. We have accordingly simply listed the number, range and means for the measurements and indices, and tabulated the number and percentage of the eye color gradations.

It is interesting to note that all 11 of our Gypsies have dark eyes which were recorded as either dark brown or brown. The absence of some light and mixed light eyes in this series is outstanding. Dark brown eyes are much more frequent than the brown variety with 8 out of the 11 in the former class. The mean age of the group is 32.90 years, and the stature is moderate with a mean of 168.81 centimeters. In stature then, the Gypsies are comparable to almost all the other series presented in this manuscript. The head is of moderate length but distinctly narrow in width. Only the Samaritans, Bedawins and Turkomans of all the groups in our study have greater head lengths. In head width, however, the Gypsies are narrower than any of the other groups in this study. The mean cephalic index of 76.65 for the Gypsies is a dolichocephalic mean and is lower than all the other series except the Bedawins (76.29) and the Turkomans (75.33). In the height of the cranial vault the Gypsies present a mean of 130.42 millimeters which is markedly lower than the cranial vaults of any of the other groups. The forehead is quite narrow, and the breadth of the face with a mean of 133.80 millimeters is very small and is only exceeded in narrowness by the Samaritans.

The Gypsies have very short faces, as may be seen from the low physiognomic, total facial and upper facial dimensions. The total facial index of 87.90 is on the border line of mesoprosopy and leptoprosopy. The upper facial index, however, falls into the leptene classification. The length of the nose is also short with a mean of 49.86 millimeters, but in nasal width the Gypsies attain moderate dimensions. Accordingly, the mean nasal index (73.50) is mesorrhine. The lips are on the heavy side with a mean of 15.60 millimeters, and the mouth is only medium in its breadth. The ear length is distinctly short in the Gypsies with a mean of 57.27 millimeters, far shorter than any of the other groups presented in this study.

TABLE 26. GYPSY MALES

MEASUREMENTS, INDICES AND OBSERVATIONS

'MEASUREMENTS	No.	Range	Mean
Age	11	18– 59	32.90
Stature	11	158–178	168.81
Head length	11	179–196	186.27
Head breadth	11	135–149	143.35
Head height	11	122–141	130.42
Minimum frontal diameter	11	101–112	104.70
Bizygomatic diameter	11	130–144	133.80
Inter-ocular diameter	11	28–33	30.92
Physiognomic face height	11	159–182	173.58
Total face height	11	105–134	117.45
Upper face height	11	65– 79	72.00
Nose height	11	44– 55	49.86
Nose breadth	11	31– 45	36.65
Mouth breadth	11	44– 55	51.04
Lip thickness	11	12– 21	15.60
Ear length, right	11	50– 67	57.27
Hand squeeze, right	11	26– 49	36.81
Hand squeeze, left	11	20– 58	33.54
INDICES			
Cephalic index	11	71– 79	76.65
Length-height index	11	64– 78	69.92
Breadth-height index	11	85–102	90.92
Fronto-parietal index	11	66– 77	72.19
Cephalo-facial index	11	88–102	93.65
Zygo-frontal index	11	72– 83	78.22
Facial index	11	75– 94	87.90
Upper facial index	11	49– 63	54.92
Nasal index	11	64– 99	73.50

OBSERVATIONS

Eye Color	No.	%
Dark brown	8	72.73
Brown	3	27.27
Total	11	100.00

From the photographs it appears that the head hair is either straight or wavy and the face hair well developed. Brow ridges are not very heavy, but the eyebrows do attain great thickness in a few instances. The forehead is low in almost every case, and the malars appear to be quite flat in their anterior aspect. There are no instances of a depressed nasal tip, and the profile of the nose rarely presents a marked convexity as among Iranian Plateau groups. The gonial region is rather weak in its lateral development and the jaw narrows rapidly in its anterior portion.

Racially, this group of Gypsies is strongly Mediterranean. This is its basic stock. In addition there are some suggestions in the antero-posterior contour of the cranial vault and in the absolute height of the cranial vault of a small amount of Armenoid-Iranian blood. There is not, however, enough of this element to make for the pronounced nasality that is so characteristic of this latter race type.

CONCLUSION

It is the opinion of the author that the detailed analysis of the anthropometric data of the groups discussed in this monograph serves to give a clearer understanding of the racial anthropology and history of the Near Eastern area.

The basic element underlying virtually all the groups in the Near East is the Mediterranean race. Two varieties of the Mediterranean race are discernible. By far the most important and the most heavily represented is the gracile, slender, Mediterranean-Arab type. It is found in its purest form in our series among the Bedawins, in a more diluted degree in the Moslems and in varying proportions among all the other groups. Of secondary ranking is the more rugged, heavy boned Atlanto-Mediterranean type. The latter variety of the basic Mediteranean race never reaches a status of major significance in any of our series but is most heavily represented in the Samaritans.

After the Mediterranean the next most important element in the Near East is the Iranian Plateau. This racial type with its dominant nasality is seldom found in a pure form. When identifiable it is usually discovered associated or mixed with some variety of Alpine stock to form what is commonly referred to as Armenoid. The Samaritans and to a lesser degree the Nusairiyeh present this Iranian Plateau and Armenoid-Iranian Plateau blood most characteristically.

The Alpine race follows very closely on the heels of the Iranian Plateau in the order of contributory elements in the racial set-up of the Near Eastern area. It is a major factor in many of the groups discussed in this study, particularly among the Maronites and the Greek Orthodox series. Also present in the Near East are small amounts of Nordic and mixed Nordic types and some smatterings of East Baltic and Dinaric forms.

Without going into the question of the complicated history of the Near East area, the probable sequence of racial events may be stated as follows: The primary racial group and perhaps the earliest is the Mediterranean with both varieties, the Atlanto and the Arab, making their appearance from early times. Following these people we find the Iranian Plateau race coming from an easterly direction. This racial strain overlaid the basic Mediterranean blood of many of the Near East groups. Immediately upon the arrival of the Iranian Plateau elements we find a large infusion of Alpine. The subsequent adulteration of the basic Mediterranean was accomplished not only by the intermixture of first Iranian Plateau and then Alpine separately, but also by the comingling in a firm pattern of these two elements in the form which I have referred to as Armenoid-Iranian Plateau. After the Alpine, and in consonance with the increased arrival of the Alpines, we find the appearance of the Nordics, mixed Nordic and East Baltic groups which became particularly strong during the Hellenistic and Roman periods.

The present racial status of the groups in this study may be traced to the constant intermingling, inbreeding and resorting of the above racial elements in varying proportions and in different degrees.

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PAPERS

OF THE

PEABODY MUSEUM OF AMERICAN ARCHAEOLOGY
AND ETHNOLOGY, HARVARD UNIVERSITY

VOL. XVI—NO. 3

FOSSIL MAN IN TANGIER

BY

MUZAFFER SÜLEYMAN ŞENYÜREK

WITH AN INTRODUCTION BY

CARLETON S. COON

CAMBRIDGE, MASSACHUSETTS, U.S.A.
PUBLISHED BY THE MUSEUM
1940

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KRAUS REPRINT CORPORATION
New York
1967

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Printed in U.S.A.

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ABSTRACT

THE human specimens described in this paper consist of a fragmentary maxilla of the left side belonging to a child of about nine years of age, and an extensively worn left upper second molar belonging to a second and older individual. In this maxilla the permanent incisors and the first molar had erupted, but have fallen out. The permanent canine and premolars and the permanent second molar, which is missing, had not yet erupted. The maxillary fragment is large and thick and is characterized by the lack of a canine fossa and by the outward and backward slope of the zygomatic process of the maxilla. The simian nasal groove has been retained. The permanent teeth extracted from the maxilla, as well as the isolated upper molar, show a close relationship with Neanderthal man. Comparison of these fossil specimens with other hominids indicates that they may be considered North African representatives of the species *Homo neanderthalensis.*

INTRODUCTION

The following report is concerned with one human maxillary bone and one human tooth found in May, 1939, in the High Cave (Mugharet el 'Aliya), one of the Caves of Hercules, some five kilometers south of Cape Spartel on the Atlantic coast of the International Zone of Tangier, in Morocco. The specimens were associated with a thin lens of red grit lying some six meters below the surface of the cave deposits. They were found in conjunction with fossil animal bones which appear to be of Pleistocene antiquity, and with flint artifacts. The trench in which the specimens were discovered was dug by the present writer in collaboration with Mr. Hooker Doolittle, American Consul at Tangier, and Dr. Ralph Nahon of Tangier. Mr. Doolittle and Dr. Nahon had previously excavated the Neolithic level of the cave, and have since presented their Neolithic material to the Peabody Museum.

The stratification of the cave is as follows, from top to bottom:

1. Sand, sterile.
2. Gray earth, Moorish and Roman artifacts and skeletal remains.
3. Calcareous crust, sterile.
4. Black earth, Neolithic artifacts and skeletal remains.
5. Red gritty sand, containing not only Neolithic specimens, but also what appear to be evolved Mousterian or very late Levalloisian artifacts. (Red #1). The association of these horizons within this layer is not yet clear.
6. Dark brown cave-earth, with implements of Middle Palaeolithic type. (Brown #1)
7. Orange sand, sterile. } (Orange #1—Gray)
8. Gray clayey sand, sterile. }
9. A layer of red gritty sand (Red #2), in which the human remains in question were found. The lower part of this layer graded into an orange sand (Orange #2).
10. Sandstone bone breccia.
11. Yellow sand.

The specimens described in this report came from an alcove in the cave, in which layers 7 and 8 were not present. Since the molar tooth was found *in situ* by the writer, there can be no question of its association with the layer designated as Red #2 (Deposit 9). The maxilla was found in the sieve after a bucketful of apparently unmixed sand from this layer had been sifted. There is no reason to believe that it is intrusive, but the fact that it was not seen *in situ* prevents its association with this horizon from being absolute.

At the time of writing it is too early to state the age of Deposit 9: archaeological, geological, and palaeontological studies must be completed before this may be done. In many respects the industry of Deposit 6 is similar to the Upper Mousterian (Layers 1 and 2) of the Devil's Tower, Gibraltar,[1] but in addition to the typical points, scrapers, etc., distinctively North African elements are present. Only tentatively, therefore, may it be said that the specimens are of Late Pleistocene date, and of a general Middle Palaeolithic cultural association.

Carleton S. Coon

Cambridge, Mass.
January, 1940.

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[1] Garrod, 1928.

HUMAN REMAINS

The discovery of the fossils has been described by Professor C. S. Coon. Before entering into a detailed description of the fossils I wish to express my gratitude to Professors E. A. Hooton and C. S. Coon for entrusting the description of these hominid remains to me.

PRELIMINARY DESCRIPTION OF THE REMAINS

The remains belong to two individuals. A young individual is represented by a fragment of a left maxilla and an older individual by a much worn left upper second molar.

The maxillary fragment belongs to a child of about nine years of age. It contains the sockets of the permanent upper first molar and those of the two permanent incisors (fig. 1, b). Behind the socket of the permanent first molar is situated the anterior part of the socket of the unerupted upper second molar. Between the sockets of the permanent first molar and permanent lateral incisor, the socket of the milk canine and the sockets of the two milk molars are preserved. The two permanent premolars are still in their alveoli and unerupted. The permanent canine is also unerupted. On the side of the maxilla the lower part of the broken zygomatic process of the maxilla is preserved, and internal to this the floor of the maxillary sinus is exposed. In the anterior part of the upper surface of the alveolar process, a break in the bone exposes the root of the still unerupted permanent canine. On the inside of the upper surface, the lateral part of the nasal floor and a very small part of its lateral wall are preserved. The nasal floor is broken toward the back, and is relatively better preserved in its antero-lateral part. The anterior part of the nasal floor toward the middle and the anterior wall of the socket of the permanent upper central incisor are missing. In the palate the lateral part of the incisive canal is preserved, and from there the break in the bone proceeds outward and backward, so that a reconstruction of the palate has not been attempted.

The second individual is represented by a heavily worn left upper second molar. A great part of the crown is worn away and the dentine is completely exposed. However, the roots are well preserved.

AGE

In the maxilla, the permanent upper first molar and the two permanent incisors had erupted, but all these teeth have fallen out and are missing. The septum of the socket of the permanent first molar is low, probably because of a relatively well developed body. Behind the socket of the permanent first molar lies the anterior part of the socket of the permanent upper second molar. (fig. 2, a). Both the anterior wall of this fragmentary socket and the anterior part of its roof are smooth; there is no indication of an antero-posterior septum whatsoever. This fragmentary socket was compared with that of an Indian child in whom the permanent first molar had erupted while the permanent second molar, which consisted of the crown only, was still in its socket. When the jaw of this Indian child was cut, the socket of the unerupted upper second molar, in its corresponding parts, was found to resemble that of the fossil maxilla. From this it was inferred that in the fossil maxilla the permanent upper second molar was still in its socket and unerupted.

Between the sockets of the permanent upper first molar and that of the permanent second incisor, the sockets of the milk canine and of the two milk molars are preserved. The alveoli of these deciduous teeth show some absorption and some fractures. The three sockets of the second milk molar can be seen in fig. 1, b. A part of the crown of the permanent second premolar can be observed through the internal socket of the second milk molar. The sockets of the first milk molar are partly broken and partly absorbed. On the lateral part of this section of the maxilla, the permanent upper first premolar is embedded obliquely and, owing to a break on the external side of this part of the dental arch, it can be observed in its socket. The socket of the milk canine is broken in its external part. Internal to the socket of the milk canine is a gubernacular canal. The skiagram (fig. 2, d) shows that the permanent canine was developing considerably above the level of the permanent premolars.

If the time of eruption of the teeth of modern man is applied to the above description, one may conclude that the individual was about nine years of age. Naturally, this way of fixing the age of fossil man cannot be precise since we have no way of knowing, in terms of years, at exactly what ages the teeth of various fossil men erupted.

The isolated upper molar comes from an older individual, as is shown by the great extent of wear on its crown. It is impossible, however, to fix its precise age since the degree of wear does not depend upon age alone but also on other strong factors such as the relative amount of grit in food, etc.

Sex

To fix the sex of a fossil jaw with a fair degree of accuracy, we must have a number of specimens of the same kind so that the sex of the individuals can be determined from the variations. Unfortunately we have only two specimens, both fragmentary. However, in later pages it will be shown that both the maxillary fragment and the isolated upper molar are large. Because of their large size the writer is inclined to believe, provisionally, that both the maxillary fragment and the upper molar probably belong to male individuals. However, it must be emphasized that this is only a provisional opinion to be held until further remains are discovered from this region.

FIRST INDIVIDUAL

Maxillary Fragment

As has been stated above, the bone is very fragmentary. Yet it is fortunate that some of its important and diagnostic regions are partly preserved, so that some idea of the racial affinities of this child may be gained.

On the side of the maxilla the lower part of the broken zygomatic process of the maxilla is preserved. Its lateral part is broken, and it is impossible to know how much of the bone is missing; hence the position of the zygomatic-maxillary suture cannot be determined. The preserved part of the zygomatic process of the maxilla is very massive and its axis, in *norma basilaris*, is directed strongly outward and backward, more so than in the maxillae of young Indians and Egyptians with which it was compared (fig. 1, b). This sloping zygomatic process is also seen in the Gibraltar child[1] and seems indicative of the retreating, chimpanzee-like malars of Neanderthal man.

The break in the bone proceeds from the zygomatic process to a little above the floor of the nose, including a small portion of the lateral wall of the nasal cavity in its anterior part. A comparison with the Indian children shows that there is no canine fossa in the fossil maxilla. In modern children, if one takes a cross section of the maxilla, between the floor of the nasal cavity and the lower surface of the zygomatic process, a considerable concavity appears in the intervening region, and this concavity represents the lower part of the canine fossa. In the fossil maxilla, on the other hand, this region is convex (fig 1, c). The lack of a canine fossa is also seen in the Gibraltar child.[2]

According to Boule[3] the lack of canine fossa and the retreating malars are characteristic features of Neanderthal man. Buxton[4] has shown that these characteristic Neanderthal features are also present in the Gibraltar child, whose age at death was about five years. It has been shown above that the fossil Tangier maxilla also presents these characteristic Neanderthaloid features.

On the top of the alveolar process the floor of the maxillary sinus is exposed (fig. 1, c). The floor of the sinus is large and triangular. From the fracture through which the root of the permanent canine is exposed, the floor of the sinus slopes downward, and then rises toward the socket of the unerupted permanent second molar. A deep groove for the vessels and nerve traverses the floor of the sinus from behind the permanent canine backward and outward.

The antero-medial part of the nasal floor, together with the anterior wall of the socket of the permanent first incisor, is broken. However, the antero-lateral part of the nasal floor, with a very small part of the lateral wall of the nasal cavity, is preserved. A small part of the floor behind this part is also present. Then there is a considerable break in the floor of the nose, though the lower surface of the palate is preserved in this region. Behind this break there is a very small piece of the nasal floor.[5] This small piece shows that the posterior portion of the nasal floor lay approximately on the same plane as the anterior portion (fig. 2, c).

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[1] Buxton, 1928. [2] Buxton, 1928. [3] Boule, 1913. [4] Buxton, 1928.

[5] It is regrettable that this small piece at the back of the nasal floor is now broken. It is fortunate that the specimen was photographed before this break occurred.

If the maxilla is held on a plane passing through the anterior part of the nasal floor and the lower surface of the zygomatic process of the maxilla, it is seen that in the chimpanzee, and even more so in the gorilla, the back part of the nasal floor is lower than the front part, while in man the two parts lie approximately in a single plane. An orang-utan, examined for this purpose, showed the human condition in this respect. The Tangier fossil also shows the human condition.

In the anterior portion of the nose, the floor rises slightly toward the mid-line; this probably indicates that a nasal spine once existed and has been lost.

The most important feature, however, of what remains of the nasal floor, is its antero-lateral portion. Here it is seen that the nasal floor passes into the external surface of the alveolar process (figs. 2, b and 3, b) in the following manner: on the anterior part of the nasal floor, although still within the cavity of the nose, a rounded ridge appears, and then the floor declines sharply downward. There is another rounder and external ridge, where the nasal floor merges with the external surface of the alveolar process. Between these two ridges lies a shallow depression. That we are dealing with a simian nasal groove cannot be doubted. From the presence of this simian nasal groove it may be inferred that the missing portion of the inferior margin of the nasal aperture was also ill defined, and that the nasal spine must have been relatively small.

We know that a simian nasal groove is present in the anthropoids, in Rhodesian man and in primitive races of modern man, while advanced human races have a more or less sharp nasal sill. It is curious, however, to find that Neanderthal man in Europe shows a tendency in the direction of a relatively well defined nasal sill. The following quotation from Sir Arthur Keith indicates the tendency present in the inferior margin of the piriform aperture of Neanderthal man. Sir Arthur Keith[1] states:

> We are surprised to note, however, that one simian feature is absent from the nasal region of the Neanderthal skull. In the chimpanzee's skull (fig. 72) the side margin of the bony nasal aperture descends towards the teeth, bounding a groove or gutter on the floor of the entrance to the nasal cavity. These nasal grooves or gutters are also present in the skull of many primitive modern races—an anthropoid or simian condition. The simian

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[1] Keith, 1925, vol. 1, p. 207.

nasal gutter is present in the Combe Capelle skull to a slight degree, but not a trace of it is present in the Gibraltar skull. There, as in the most highly evolved of modern skulls, the lateral margins of the nose turn inwards to the nasal spine, forming a sharp lower margin at the entrance to the nose (fig. 71). The simian nasal gutter is a character to be ascribed to the modern type of man rather than to the Neanderthal type, although in the latter it may, as in the specimen from La Chapelle-aux-Saints, have some degree of representation.

In the Gibraltar child[1] and the La Quina child[2] also the inferior margin of the piriform aperture appears to be relatively well defined. However, in some of the Krapina individuals older than our fossil some development of a simian nasal groove can be seen.[3] So while Neanderthal man tends to have a relatively well defined nasal sill, the species is variable in this respect, since certain specimens still retain some degree of a simian nasal groove. In the form of the inferior margin of the piriform aperture the Krapina Neanderthals approach the Tangier child.

As has been described above, the anterior part of the alveolar process is broken, but the anatomy of this region is such as to suggest that some degree of prognathism must have been present.

The dental arch is well rounded. Owing to the oblique fracture of the palate, however, a reconstruction of the shape of the dental arch was not attempted. The alveolar process is extremely thick for a nine year old individual, as the following measurements will indicate. At the level of the permanent first molar the thickness of the alveolar process, from its junction with the palatine process to the external surface, is 18.8 mm. in the Tangier child. The corresponding measurements in two adult male Australians are 16.0 and 16.3 mm.

Furthermore, in the Tangier child the tooth sockets are very large. The internal breadth and length of the socket of the permanent second incisor are 8.5 and 7.8 mm. respectively; in the two adult male Australians, 7.0 and 7.4 mm. for the breadth, and 6.2 in each case for the length. The breadth of the socket of the second milk molar is 13.5 mm. in the Tangier child, and 9.5 mm. in an Indian child of equal age. The internal breadth of the socket of the permanent first molar of the Tangier child is 15.3 mm., of one of the adult male Australians, 12.6 mm.

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[1] Buxton, 1928. [2] Keith, 1930.

[3] See Hrdlička, 1930, and the illustrations of Gorjanović-Kramberger, 1906.

The roof of the palate is very thick. At a place about 6.5 mm. behind the posterior rim of the incisive canal, projected on a line parallel to the long axis of the palate, the vertical thickness of the palate is 6.0 mm. in the Tangier child. The thickness of the palate of an adult male European, taken at the same place, is only 3.0 mm. The same measurement for an adult male Australian, taken on the left side, is 5.8 mm. The palate is not only thick but is also of large dimensions. The distance from the most posterior point of the socket of the permanent second incisor to the middle point of the anterior surface of the socket of the permanent first molar is 21.5 mm. in the Tangier child, the same as that of an adult male Australian.

To summarize the foregoing paragraphs it may be said that, despite its youth, the Tangier child possessed a large palate with large teeth and exceptionally thick bone. In the thickness of the bone the Tangier child exceeds not only all sapiens children but also some sapiens adults, notably the male Australian.

From the basal view it is seen that a part of the premaxillary suture is preserved on the palate; this condition is also found in *Homo sapiens* adults in some cases. The suture leads laterally away from the incisive canal and is obliterated near a point between the sockets of the milk canine and the lateral permanent incisor. In the Gibraltar child,[1] which was four years younger than our specimen, there is no trace of the premaxillary suture on the palate. There is, however, no trace of the premaxillary suture on the facial surface of the alveolar process of the fossil maxilla. This is to be expected from the early closure of this part of the premaxillary suture in man.[2]

To summarize the evidence of the maxillary bone, it may be stated that, in the lack of a canine fossa and in the configuration of the zygomatic process, Tangier man resembles Neanderthal man. As for the retention of a simian nasal groove, it can be stated that Neanderthal man tends to have a relatively well defined nasal sill, but certain individuals of this species still retain some degree of a simian nasal groove. Since the simian nasal groove is also seen in other types of man, its retention in the present specimen neither proves nor disproves that Tangier man was a member of the Neanderthal species. The same is true of the thickness of the bone, since this feature more or less characterizes all early types of man. Hence the Neanderthaloid relationship, indicated by the absence of a canine fossa and by the configuration of the zygomatic process, is not invalidated.

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[1] Buxton, 1928.

[2] Even in some of the infant apes, especially the chimpanzee, the facial portion of the premaxillary suture is closed. See Ashley-Montagu, 1935.

The Teeth

After the maxillary fragment had been described and photographed, the permanent upper canine and the permanent upper first premolar were extracted from their sockets by cutting the surrounding bone with a dental drill. The permanent second premolar was left in its socket in order not to damage the bone any further. The teeth extracted from the jaw are described below.

The Left Permanent Upper Canine. *Morphology.* The canine in question consists of a crown and an undeveloped root. It is a robustly built tooth, markedly developed in the bucco-lingual diameter.

When the buccal surface of the canine is examined it is seen that the sides of the crown diverge from the base toward the apex for a distance, and then converge for a shorter distance to the apex. In this respect Tangier man agrees with the hominids and differs from the anthropoids. In the canines of all male and some female anthropoids the sides of the crown converge continuously from the base to the tip. However, in those of some female anthropoids which the writer examined, the sides of the crown diverge for a short distance and then converge for a longer distance to the tip. In the Tangier canine, on the other hand, the segment where the convergence occurs is relatively short, as is the case with the hominids.

When looked at from the occlusal view, the buccal surface of the crown is convex, the convexity being greater than that in the case of recent man. However, this surface, from the occlusal view, is narrower antero-posteriorly than is that of Sinanthropus. In some of the Sinanthropus canines there is a broad ridge, or swelling, at the middle of the buccal surface, which tapers to the apex. In our specimen there is a round ridge, but here it is displaced mesially instead of being in the middle (fig. 3, c, O). This ridge gives the buccal surface, from the occlusal view, an asymmetrical appearance, and divides the buccal surface into a small mesial part and a larger and flatter distal part. This distal portion, from the occlusal view, slopes strongly backward and inward. In the cast of the Le Moustier Neanderthal, on the right side, the buccal surface of the upper canine is also asymmetrical, and the posterior portion slopes backward and inward. It may be that this strong asymmetry of the buccal surface is a characteristic feature of at least some Neanderthal men.

The basal part of the buccal surface of this tooth is characterized by a thickening; at the same time, on the mesial and distal sides, a small triangular prominence appears. This prominence is more strongly developed on the distal than on the mesial surface (fig. 3, c, D, M, L). These two phenomena, the basal thickening of the crown and the marginal triangular prominences, represent together a reduced cingulum. The marginal triangular surface, which can be well seen on the distal surface, is connected with the basal tubercle, and continues into the cutting edge. This distal marginal triangular prominence is separated from the lingual surface by a fissure. The corresponding feature on the mesial side is less marked. Here it is seen to be a rim along the margin, which is separated from the lingual surface by a fainter fissure and which is also separated from the basal tubercle by another fissure.

The meaning of these formations becomes clear when this tooth is compared with the upper canine of Sinanthropus.[1] On the Tangier canine these features are the diminished remnants of better defined formations which are characteristic of the upper canines of the Peking specimen. In their diminished state, these marginal triangular prominences on the upper canine of the Tangier child represent structural[2] stages in the evolution of a primitive canine into that of modern man, which is devoid of such formations. The triangular prominences are not seen in Le Moustier but are found, also in a reduced state, in the upper canine of the Krapina crania,[3] which in this respect approach the Tangier specimen.

On the lingual surface is a well developed and rounded basal tubercle (fig. 3, c, L), which continues toward the apex in the form of a ridge; then there is a depression in this ridge, and then the middle part of the surface rises again and culminates in a distinct tubercle internal to the apex. Between this tubercle and the marginal triangular prominence the distal margin presents a slight thickening toward the lingual surface. There is no corresponding formation on the mesial margin, which in that portion is flatter.

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[1] Weidenreich, 1937, figs. 38–43.

[2] Not a direct and chronological stage.

[3] Weidenreich, 1937.

A median ridge in the lingual surface is seen in the canines of Sinanthropus[1] and those of Le Moustier.[2] However, in the Le Moustier specimen the basal tubercle is very large and sharply separated from the adjoining parts. In the Tangier specimen, however, the basal tubercle, though well developed, is not sharply separated. In some forms of Sinanthropus with well developed basal tubercles there are finger-like prolongations leading from the basal tubercle, which give the lingual surface of the canine crowns an appearance very much like that of the upper central incisor. In the Tangier canine, though the basal tubercle is well developed, there are no such finger-like prolongations.

Measurements.[3] The length, breadth and values of robustness of the upper canines are listed in Table 1.

The values of robustness show that, with the exception of the female Plesianthropus, all the anthropoids listed here exceed Tangier man in the size of the upper canine. It appears that reduction of the upper canine has proceeded farther in Plesianthropus than in the female Sinanthropus. The minimum value of robustness of the upper canines of female Sinanthropus as yet published is 83.30,[4] which is larger than that of Plesianthropus. This reduction is not found in the upper first premolar of Plesianthropus. In the size of the upper first premolar Plesianthropus exceeds the largest upper first premolar of the female Sinanthropus so far described. The value of robustness of the upper first premolar of the female Plesianthropus is 98.6,[5] the maximum for the female Sinanthropus 92.8.[1] Thus it appears that in the reduction of the upper canine Plesianthropus is more advanced than Sinanthropus; that is, the former has overshot the early hominids in reduction of the upper canines. The taxonomic position of Plesianthropus will be discussed briefly in a later page.

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[1] Weidenreich, 1937. [2] Gregory, 1922.

[3] In this paper the term "length" is used as a synonym for the mesio-distal diameter of the crown and the term "breadth" as a synonym for the bucco-lingual diameter. The length and breadth measurements of all the Tangier teeth (canine, premolar, and the molar) were measured as the maximum mesio-distal and the maximum bucco-lingual diameters, respectively. The value of robustness is obtained by multiplying the length by the breadth (length ×breadth) and is used as an index of crown size. Values of robustness of the various races were calculated from the average length and breadth measurements given by various authors. The figure in the bracket beside the measurements of the anthropoids indicates the number of specimens measured. In this report the averages of the apes are for both sexes. A small series of modern man, containing skulls of different races measured by the writer, is called the *Homo sapiens* group.

[4] Weidenreich, 1937, Table 7, no. 68.

[5] Calculated from Gregory and Hellman, 1939.

Table 1. MEASUREMENTS OF THE UPPER CANINE

	Length	Breadth	Robustness of the crown
Gorilla	(8) 21.97 mm.	(8) 16.37 mm.	365.03
Pan	(6) 12.96	(6) 9.98	130.74
Pongo	(5) 15.62	(5) 12.66	205.67
Sivapithecus indicus (Gregory, Hellman, Lewis, 1938)	(2) 14.85	(2) 11.55	171.40
Proconsul africanus (Hopwood, 1933)	11.3	9.1	102.83
Sivapithecus sivalensis (Gregory, Hellman, Lewis, 1938)	11.05	10.4	114.92
Plesianthropus ♀ (Gregory, and Hellman, 1939)	8.6	9.0 (est.)	77.4
Sinanthropus (calculated from Weidenreich, 1937)	9.43	10.15	95.89
Tangier man	8.2	10.9	89.38
Le Moustier (Klaatsch and Hauser, 1909)	9.0	10.0	90.0
Krapina E (G.-Kramberger, 1906)	9.3	9.3	86.49
Krapina B (G.-Kramberger, 1906)	9.0	10.55	94.95
Spy 1 (Fraipont and Lohest, 1887)	7.5	9.0	67.5
Spy 2 (Fraipont and Lohest, 1887)	8.0	10.0	80.0
Australians (Campbell, 1925)	8.4	9.0	75.6
Pecos Indians (Nelson, 1938)	8.05	8.36	67 29
Bantu (Shaw, 1931)	7.6	8.2	62.32
Whites (Black, 1902)	7.6	8.0	60.8
Bushmen (Drennan, 1929)	7.5	7.8	58.50
Homo sapiens	7.89	8.53	67.67

The Tangier canine is smaller than that of Sinanthropus, but much larger than those of recent man. According to Weidenreich[2] the average robustness of the upper canine of Neanderthal man is 88.5, which is very near the value for the Tangier child. Among Neanderthal men, the size of the Tangier canine is very near that of Le Moustier and falls in the range of those from Krapina, while it exceeds both of the Spy individuals. However, the upper canine of the Tangier man differs from that of Sinanthropus and from those of the Neanderthal men of Le Moustier and Krapina in having a shorter length and greater breadth. It exceeds the upper canines of the Spy Neanderthals in both dimensions, but especially in the breadth measurement.

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[1] Weidenreich, 1937, Table 9, no. 142.

[2] Weidenreich, 1937, diagram 2.

Tangier man exceeds the averages of all recent men in the size of the upper canine. The superiority of the Tangier canine is more pronounced in its breadth than in its length; indeed, in the length measurement the Australian canines slightly exceed it. So it is evident that the Tangier canine is characterized by a very large breadth and a relatively short length.

In the size of the upper canine, Tangier man and Neanderthal man occupy an intermediate position between Sinanthropus and recent man, and represent a structural stage in the reduction of the size of the canines of *Homo sapiens*.

Table 2. THE CROWN INDEX OF THE UPPER CANINE

Gorilla	(8)	74.57
Pan	(6)	76.90
Pongo	(5)	81.0
Sivapithecus indicus (Gregory, Hellman, Lewis, 1938)	(2)	77.85
Proconsul africanus (Hopwood, 1933)		80.53
Sivapithecus sivalensis (Gregory, Hellman, Lewis, 1938)		94.10
Plesianthropus ♀ (Gregory and Hellman, 1939)		104.6
Sinanthropus (calculated from Weidenreich, 1937)		107.86
Tangier man		132.92
Le Moustier (Klaatsch and Hauser, 1909)		111.11
Krapina E (G.-Kramberger, 1906)		100.00
Krapina B (G.-Kramberger, 1906)		117.22
Spy 1 (Fraipont and Lohest, 1887)		120.00
Spy 2 (Fraipont and Lohest, 1887)		125.00
Australians (Campbell, 1925)		107.10
Pecos Indians (Nelson, 1938)		104.00
Bantu (Shaw, 1931)		108.10
Whites (Black, 1902)		105.30
Bushmen (Drennan, 1929)		104.10
Homo sapiens		108.18

The Tangier canine is characterized by a high crown index.[1] This, as shown above, is due to a large breadth as well as to a relatively short length. While the Tangier canine exceeds the crown indices of the upper canines of the hominids[2] listed here, the nearest approach to it is made by Spy #2. The crown index of the upper canine of Spy #2 is 125, which is about 8 index units lower than that of Tangier man. The upper canines of the European Neanderthal group tend to have a high crown index. It appears that this tendency has been carried even farther in the Tangier specimen.

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[1] The crown index expresses the breadth as a percentage of length (breadth ×100/length).

[2] The available maximum crown indices of the upper canines of other hominids are as follows: Sinanthropus 115.2; Bantu 121.4, Shaw, 1931; Pecos Indians 118, Nelson, 1938; *Homo sapiens* 118.

However, the high crown index of the Tangier canine is not a primitive feature. It is, in fact, ultra-human and specialized, since the upper canines of the apes have much lower crown indices than do those of the hominids. That is, the upper canines of the apes are developed in the mesio-distal diameter (see Table 1). Among the three living genera of the great apes, the maximum crown index obtained by the writer is 85, which is that of an orang. *Sivapithecus sivalensis* has a higher crown index than those of the living great apes, but falls short of the hominid figures. However, Plesianthropus[1] appears to approach the hominids remarkably in this respect, but still falls far below the crown index of Tangier man.

Table 3. THE CROWN HEIGHT OF THE UPPER CANINE

Gorilla	(5) 25.95 mm.
Pan	(3) 20.42
Proconsul africanus (Hopwood, 1933)	15.00
Sinanthropus (calculated from Weidenreich, 1937)	13.9
Tangier man	12.9
Pecos Indians (Nelson, 1938)	9.63
Bantu (Shaw, 1931)	9.9
Bushmen (Drennan, 1929)	7.9
Homo sapiens	10.16

The crown height was measured from the tip to the base of the enamel on the buccal surface.

The Tangier canine exceeds all the averages of recent man in the height of the crown and is 1 mm. lower than the unworn upper canines of Sinanthropus. According to Weidenreich[2] the average height of the upper canine of Neanderthal man is 13.1 mm. That is, in this respect the Tangier man is nearer to Neanderthal man than to recent man or Sinanthropus. Since it is clear from the evidence of the anthropoids, Sinanthropus, and the Neanderthals that a high canine is a primitive character, it follows that in this respect Tangier man is much more primitive than recent man. It is also evident that in this feature Tangier man and Neanderthal man are intermediate between Sinanthropus and *Homo sapiens.*

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[1] Plesianthropus is a South African fossil ape that remarkably approaches the hominids in a number of important features. But since it is of Pleistocene age, probably middle Pleistocene, it cannot be a direct ancestor of the Hominidae. Furthermore, it was shown above that in the reduction of its upper canine it had already overshot the stage represented by early man, and had paralleled the later hominids. However, it must be remembered that striking examples of parallelism are to be found in closely related forms. Plesianthropus and other South African genera in a number of other features also, approach the hominids so closely that they can safely be regarded as late and modified survivals of an earlier form from which, or from a related type, the Hominidae evolved.

[2] Weidenreich, 1937, diagram 8.

Summary. To summarize the evidence of the upper canine, it can be stated that the Tangier canine is more advanced than that of Sinanthropus and that it is nearer to that of Neanderthal man than to those of recent man or of Sinanthropus. In the asymmetry of its buccal surface it is approached by that of Le Moustier; in the retention of reduced marginal triangular prominences it is approached by the teeth from Krapina. In its size and height also the Tangier canine agrees more closely with those of Neanderthals than with those of other hominids. It differs from the upper canines of European Neanderthals and from those of other hominids in having a very high crown index. However, even in this feature Tangier man is most nearly approached by some of the European Neanderthals. Neanderthal man tends to have a high crown index in the upper canine, and it appears that this tendency has been developed even further in the Tangier specimen. In reference to its high crown index, the Tangier canine is not primitive; it is ultra-human and specialized, since this condition is the opposite of that usually seen in apes.

Left Permanent Upper First Premolar. *Morphology.* This tooth consists of a bicuspid crown with an undeveloped root. The occlusal surface of the tooth is divided by a longitudinal fissure into a larger buccal and a smaller lingual moiety (fig. 3, d, O). Each moiety carries a cusp of which the buccal is the larger and higher. However, the difference between the heights of the buccal and lingual cusps is not so great as in the unworn upper first premolars of the living apes, and in this detail the present specimen agrees with the hominids (fig. 3, d, M). The shape of the buccal surface is not oval as in Sinanthropus, but is more like that of recent man. When the crown is viewed from the distal or mesial sides, it is seen that the basal parts of both the buccal and lingual surfaces show a swollen band larger than that in recent man. This band is the remnant of a cingulum (fig. 3, d, O). On the buccal surface this basal thickening is faintly prolonged toward the tip, but it is not so clearly defined as is that of Sinanthropus. There is no cingulum in the corresponding teeth of Le Moustier or of Krapina.[1] Seen from the mesial or distal views, the buccal and lingual surfaces incline toward the tips of the cusps. The degree of inclination of these surfaces is less than that of Sinanthropus, but more than that of recent man. Judging by the cast, the inclination of these surfaces is less in Le Moustier.

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[1] Weidenreich, 1937.

When the buccal surface of the upper first premolars of anthropoids is viewed from the occlusal surface, it is seen that the mesio-buccal corner of the basal swelling is very pronounced. When the same formation is viewed from the buccal surface, it is seen that at this place the enamel ascends higher toward the root than it does on the disto-buccal corner. When the upper first premolar of Sinanthropus is viewed from the occlusal surface, the most pronounced part of the basal swelling is observed in the mesial part of the surface, and this gives it an asymmetrical appearance. In this respect Sinanthropus approaches the apes. In the Tangier premolar, on the other hand, the most pronounced part of the basal swelling is near the center (fig. 3, d, O). In the symmetry of its buccal surface, from the occlusal view, the Tangier premolar is more like that of recent man and Neanderthal man than like that of Sinanthropus.

On the mesial surface there is a slight thickening that continues into the cutting edge of the buccal cusp (fig. 3, d, M). This is a reduced triangular prominence representing a part of the cingulum which was better developed in the upper first premolar of Sinanthropus. The corresponding part of the distal surface also shows a thickening as compared with modern man. The triangular prominences are not seen in Le Moustier, Krapina,[1] or in recent man. In this respect, therefore, the Tangier specimen is more primitive than are the available European Neanderthals. In the reduction of the cingulum and of the triangular prominences, Tangier man represents a structural stage in the evolution of the simplified premolars of modern man.

The occlusal surface of the upper first premolar of the Tangier child shows a well defined longitudinal fissure (fig. 3, d, O). This fissure is also seen in Sinanthropus, in Le Moustier, and in recent man and may be contrasted with the condition found in the unworn upper premolars of living great apes. In ape teeth, accessory ridges, which need not be described here, descend from the slopes of the buccal and lingual cusps and fuse in the middle, thus obstructing the fissure. In the Krapina Neanderthals, however, the course of this fissure is made irregular by accessory ridges which may represent a modified development of those seen in Sinanthropus.

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[1] Weidenreich, 1937.

The chewing surface, in its simplicity, differs from the condition found in apes and in Sinanthropus and approaches that of Le Moustier and of recent man. In Sinanthropus there are two accessory ridges on the buccal cusp, and a number of them on the lingual cusp. The simplified chewing surface of the Tangier premolar can be readily matched by the upper first premolars of some recent men. The lingual surface of the buccal cusp is rounded and on its distal part there is a very faint ridge. The same form is seen on the lingual cusp, but here the distal ridge is relatively better defined. While these faint ridges may represent the much reduced and simplified remnants of better developed formations, seen on the chewing surface of the upper first premolar of Sinanthropus, they are paralleled in some premolars of recent man. A comparison of fig. 3, d, O with Weidenreich's fig. 64[1] will show the simplicity of the chewing surface of the upper first premolar of Tangier man. The chewing surface of the Tangier upper first premolar resembles that of Le Moustier more closely than those of the Krapina specimens, which retain several accessory ridges. These ridges may be modified representatives of the corresponding features of Sinanthropus. In this respect the Krapina Neanderthals appear to be more primitive than Le Moustier and Tangier man.

Measurements. Tangier man has a much smaller upper first premolar than has Sinanthropus. According to Weidenreich[2] the average robustness of the upper first premolar of Neanderthal man is 85, which is larger than that of Tangier man. However, the upper first premolar of Tangier man is slightly larger than that of Spy #2 (Spy #1 is still smaller and it is slightly smaller than that of Krapina E.)

The upper first premolar of Tangier man therefore is relatively reduced, but it agrees in absolute size with the lower values for *Homo neanderthalensis.* However, in the size of this tooth Tangier man exceeds the averages of recent men, with the exception of Australian natives.

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[1] Weidenreich, 1937.

[2] Weidenreich, 1937, diagram 2.

Table 4. MEASUREMENTS OF THE UPPER FIRST PREMOLAR

	Length	Breadth	Robustness of the crown
Sinanthropus (calculated from Weidenreich, 1937)	8.32 mm.	11.87 mm.	99.59
Tangier man	7.7	10.3	79.31
Le Moustier (Klaatsch and Hauser, 1909)	8.0	10.5	84.00
Krapina D (G.-Kramberger, 1906)	8.5	11.2	95.20
Krapina E (G.-Kramberger, 1906)	8.0	10.1	80.8
Spy 2 (Fraipont and Lohest, 1887)	7.5	10.5	78.75
Australians (Campbell, 1925)	7.8	10.3	80.34
Pecos Indians (Nelson, 1938)	7.43	9.89	73.48
Bantu (Shaw, 1931)	7.2	9.0	64.8
Whites (Black, 1902)	7.2	9.1	65.52
Bushmen (Drennan, 1929)	6.8	8.6	58.48
Homo sapiens	6.96	9.39	65.31

In its crown index the Tangier premolar falls short of Sinanthropus and is within the range of Neanderthal man. The minimum crown index for the Sinanthropus upper first premolar is 139.1. In its crown index the Tangier premolar is nearer to the upper first premolar of Neanderthal man, and to those of some recent men. Neanderthal man is not distinguished from modern man in this index.

Table 5. THE CROWN INDEX OF THE UPPER FIRST PREMOLAR

Sinanthropus (calculated from Weidenreich, 1937)	142.71
Tangier man	133.76
Le Moustier (Klaatsch and Hauser, 1909)	131.25
Krapina D (G.-Kramberger, 1906)	131.76
Krapina E (G.-Kramberger, 1906)	126.25
Spy 2 (Fraipont and Lohest, 1887)	140.0
Australians (Campbell, 1925)	132.1
Pecos Indians (Nelson, 1938)	133.1
Bantu (Shaw, 1931)	132.4
Whites (Black, 1902)	126.4
Bushmen (Drennan, 1929)	126.9
Homo sapiens	134.91

The maximum crown height was measured from the tip of the buccal cusp to the base of the enamel on the buccal surface.

The height of the Tangier upper premolar is lower than that of Sinanthropus. According to Weidenreich[1] the average crown height of the upper first premolar of Neanderthal man is 9.9 mm., which is higher than that of Tangier man. However, the Tangier premolar has the same height as one of the Krapina Neanderthal specimens, while it exceeds the other. The Tangier premolar also exceeds the average crown heights of all the recent races listed here. The maximum crown height in the writer's *Homo sapiens* series is 9.0 mm., which is higher than the maximum of Bantu and slightly higher than that of Pecos Indians. So it appears that the Tangier premolar agrees in its crown height with the lower values for Neanderthal man and with the higher values for recent man; that is, it is intermediate between the two.

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[1] Weidenreich, 1937, diagram 8.

Table 6. THE CROWN HEIGHT OF THE UPPER FIRST PREMOLAR

Sinanthropus (Weidenreich, 1937)	9.7 mm.
Tangier man	9.0
Krapina D (G.-Kramberger, 1906)	8.6
Krapina E (G.-Kramberger, 1906)	9.0
Pecos Indians (Nelson, 1938)	7.95
Bantu (Shaw, 1931)	7.9
Bushmen (Drennan, 1929)	6.6
Homo sapiens	8.06

Summary. To summarize the evidence of the upper first premolar, it can be stated that the Tangier upper premolar is more advanced than that of Sinanthropus and represents a structural stage in the evolution of the upper premolars of *Homo sapiens.* In most of its features the Tangier premolar is nearer to those of Neanderthal man than to that of Sinanthropus. However, it was also shown that, in some of its features, the Tangier upper premolar is indistinguishable from those of recent men. This is natural, since Neanderthal man (or some forms at least) is also indistinguishable from recent men in the same features. The only major difference between the Tangier premolar and that of Neanderthal man is the retention by the former of a reduced cingulum and of marginal triangular prominences. In these features the Tangier premolar is more primitive than those of recent man and than the available specimens of *Homo neanderthalensis.*

General Considerations

It has been shown that the maxillary fragment is of large size. Judging by their sockets, the permanent incisors and the permanent first molar must also have been of large size. The permanent canine is larger than that of recent man and agrees in size with that of Neanderthal. The upper first premolar is relatively reduced, but in its absolute size it is still within the Neanderthal range. It is evident that this individual possessed a relatively massive maxilla. From this the following characteristics are inferred: the mandible was heavy; the bones of the cranial vault were thick; there was a strong supraorbital torus to resist the pressure of a heavy masticating apparatus; the forehead was receding.

SECOND INDIVIDUAL

The Isolated Left Upper Second Molar

The second individual is represented by a robust, left upper second molar. The crown is heavily worn but the roots are well preserved.

The Crown. *Morphology.* The crown is so heavily worn that the surface slopes, in a general fashion, from the buccal to the lingual side. This slope begins gradually from the buccal side, drops sharply in the middle, and again slopes gradually to the lingual side. Over the entire chewing surface the dentine is completely exposed; no trace of the cusp pattern remains. The wear on this tooth is so extensive that the vertical height of the enamel has been reduced to 5.5 mm. along the middle of the buccal surface and to only 1 mm. on the lingual surface. On both the mesial and distal surfaces there are contact facets, for the first and third upper molars respectively.

The chewing surface is rhomboidal in shape, with its long axis lying in the transverse direction (fig. 3, e, O). The paracone region projects slightly more buccally than does that of the metacone. In this connection, the mesial buccal root also projects buccally to some extent. From the shape and size of the chewing surface it is inferred that there were four cusps, and that the hypocone and metacone must have been relatively well developed. Recent men, especially Europeans, have a strong tendency toward the reduction of the metacone and hypocone. On the lingual half of the mesial edge the enamel is broken, but from the slope of the buccal part of this edge it is evident that the mesial margin sloped inward and backward (fig. 3, e, O). Thus the lingual margin was narrower than the buccal.

TABLE 7. MEASUREMENTS OF THE UPPER SECOND MOLAR

	Length	Breadth	Robustness of the crown
Sinanthropus (calculated from Weidenreich, 1937)	10.9 mm.	12.72 mm.	138.61
Tangier man	11.7	13.7	160.29
Homo neanderthalensis (average, Weidenreich, 1937, diagram 2)	—	—	138.50
Le Moustier (Klaatsch and Hauser, 1909)	11.5	13.0	149.50
Krapina C (G.-Kramberger, 1906)	11.4	13.3	151.62
Spy 1 (Fraipont and Lohest, 1887)	9.5	11.0	104.50
Spy 2 (Fraipont and Lohest, 1887)	10.75	12.75	137.06
La Quina (Martin, 1912)	10.6	14.3	151.58
Australians (Campbell, 1925)	10.9	13.1	142.79
Pecos Indians (Nelson, 1938)	9.94	11.24	111.72
Bantu (Shaw, 1931)	10.0	11.5	115.00
Whites (Black, 1902)	9.2	11.5	105.8
Bushmen (Drennan, 1929)	9.7	10.6	102.82
Homo sapiens	9.54	11.52	110.23

Measurements. In the following pages the Tangier molar is compared metrically with the upper second molars of other hominids.

In size the Tangier molar exceeds the upper second molars of all the hominids here listed. Indeed, it is larger than all of the Sinanthropus upper second molars discovered so far, since the maximum for this genus is 148.8. On the other hand, the upper second molars of some Neanderthals exceed the maximum for Sinanthropus, and in this respect Tangier man is more closely approached by some Neanderthals than by Sinanthropus. While the Tangier molar is larger than the upper second molars of Neanderthal man and of Sinanthropus, it is, however, smaller than the upper first molar of some Neanderthal individuals, as well as of Sinanthropus.

While the Tangier molar is distinguished from those of Neanderthal man by its larger size, it must be emphasized here that in this respect the Neanderthal group is variable; in fact the difference between the Tangier molar and the upper second molars of Krapina C or La Quina is less than the difference between those of the latter two and the Spy molars.

Table 8 shows that the crown index of the Tangier molar agrees with that of the upper second molar of Sinanthropus, and falls within the range of Neanderthal man and of recent man. Thus the crown index does not help us to distinguish the Tangier molar from those of either Pleistocene or more recent hominids.

Table 8. THE CROWN INDEX OF THE UPPER SECOND MOLAR

Sinanthropus (calculated from Weidenrcich, 1937)	117.28
Tangier man	117.09
Le Moustier (Klaatsch and Hauser, 1909)	113.04
Krapina C (G.-Kramberger, 1906)	116.66
Spy 1 (Fraipont and Lohest, 1887)	115.78
Spy 2 (Fraipont and Lohest, 1887)	118.60
La Quina (Martin, 1912)	134.90
Australians (Campbell, 1925)	120.2
Pecos Indians (Nelson, 1938)	111.7
Bantu (Shaw, 1931)	118.0
Whites (Black, 1902)	125.0
Bushmen (Drennan, 1929)	110.2
Homo sapiens	121.03

The Roots. *Morphology.* This left upper molar has three roots, which are robustly developed, in contrast to the slender roots of recent man. The buccal roots are pressed against each other and fused, the fusion being more advanced on the lingual side than on the buccal. On the buccal side there is a longitudinal fissure between the roots (fig. 3, e, B). The buccal roots stand more or less vertically, and are especially developed in a transverse direction. The mesial buccal root is wider transversely than the distal buccal root, and projects farther buccally than does the latter. The two buccal roots end in a common apex.

The lingual root is more cylindrical in cross section than the buccal roots, though its antero-posterior dimension is greater than its transverse diameter. The lingual root is fused with the mesial buccal root in its upper part. The lingual root, in the mesial or distal views, deviates from the buccal roots (fig. 3, e, D, M). The degenerate condition found in the upper molars of some recent men, in which the apices of the roots are bent against each other, is not seen in this specimen.

The angle of deviation of the lingual root is less than that of the upper first molar of Sinanthropus.[1] However, the Tangier molar differs from the upper second molar of Sinanthropus in having a freer lingual root.[2] On the other hand, in this respect the Neanderthal group is variable. In the robustness of the roots and in the angle of deviation of the lingual root, the Tangier molar approaches that of the upper second molar of La Quina.

The Height of the Roots. The height of each buccal root was measured from its apex to the cemento-enamel junction on its buccal surface; that of the lingual root was similarly measured, but on its lingual surface. The heights of the three roots of this tooth are listed below:

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[1] Weidenreich, 1937, figs. 109 and 111.

[2] Compare it with Weidenreich's figs. 119, 120 and 122.

Lingual root	15.7 mm.
Mesial buccal root	17.4
Distal buccal root	16.0

The average root height is 16.36 mm. In the following table the Tangier tooth is compared in this measurement with the upper second molars of other hominids.

TABLE 9. ROOT HEIGHT OF THE UPPER SECOND MOLAR

Sinanthropus (Weidenreich, 1937, diagram 15)	14.3 mm.
Tangier man	16.36
Spy 2 (Fraipont and Lohest, 1887)	16.00
La Quina (Martin, 1912)	16.5
Australians (Campbell, 1925)	13.6
Pecos Indians (Nelson, 1938)	12.9
Bantu (Shaw, 1931)	12.5
Whites (Black, 1902)	13.0
Bushmen (Drennan, 1929)	12.6

The Tangier molar has higher roots than the average for Sinanthropus, and agrees closely with Neanderthal man; in this respect, therefore, it is nearer to Neanderthal man than to Sinanthropus. It is also observed that the roots of the Tangier molar are higher than those of recent races.

Pulp Cavity. In a former paper the present writer[1] brought forward evidence to demonstrate that a moderate degree of taurodontism was characteristic of primitive hominids in general, and that *Homo sapiens* is derived from a moderately taurodont ancestor. With these concepts in view, it may be of interest to observe the pulp chamber of the Tangier molar.

It is known that in old and worn teeth, the pulp cavity is reduced. This principle applies not only to man, but also to the infra-human primates. Accordingly, in the Tangier molar, (fig. 2, e) the size of the pulp cavity has been greatly diminished; hence we can only infer what the size of the pulp cavity may have been when this tooth was completely formed and not yet extensively worn. The body, or the undivided portion of the root, is of submoderate depth. From this we may infer that the pulp cavity of this tooth, before its change due to age and wear, was probably taurodont only to a sub-moderate degree. In other words, it was probably initially somewhat reduced. But since known specimens of Neanderthal man[1] are variable in this respect, and since a moderate degree of taurodontism is not infrequent in *Homo sapiens*, this inference neither proves nor disproves the impression that we are dealing with the molar of a Neanderthal man.

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[1] Senyürek, 1939.

Pathology. On the upper part of the distal surface of the distal buccal root, at the cemento-enamel junction, there is an elliptical area of erosion, the greatest diameter of which lies in a bucco-lingual direction (fig. 3, e, D, B). The length of this indentation is about 4 mm. and its width is about 1.5 mm. Similar formations have been described for some of the upper and lower molars of Sinanthropus by Weidenreich, and for the lower molars of La Quina by Martin.[2] On the upper part of the mesial surface of the mesial buccal root there is, furthermore, a round and more diffuse depression, apparently of developmental character.

General Considerations

In the robustness and height of the roots and in the angle of deviation of the lingual root, taken as a whole, the Tangier molar is nearer to the upper second molar of some Neanderthals than to those of Sinanthropus or recent man. However, the Tangier molar differs from the upper second molar of Neanderthal man by its larger size, though some Neanderthals come nearer to the Tangier molar in this respect than does Sinanthropus.

The available evidence indicates that this upper molar is also related to that of *Homo neanderthalensis*; that is to say, it belongs to the same type of man that is represented by the maxillary fragment.

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[1] In the skulls excavated at Mount Carmel, of which the Tabûn type is Neanderthaloid, the teeth are stated not to be taurodont. That is, they were reduced. Keith and McCown, 1937.

[2] Martin, 1912. For a discussion of this see Weidenreich, 1937.

SUMMARY AND CONCLUSIONS

The First Individual. The maxillary fragment is large and thick. As judged by their sockets, the permanent incisors and first molar and the two milk molars also must have been large. In the lack of a canine fossa and in the configuration of the zygomatic process of the maxilla, Tangier man agrees with Neanderthal man. In this maxilla a simian nasal groove has been retained. Although Neanderthal man tends to have a relatively well defined nasal sill, he is variable in this feature, since certain specimens still retain some degree of a simian nasal groove.

The immature left upper canine extracted from its socket is more advanced than that of Sinanthropus and agrees in most of its features with that of Neanderthal man. In the strong asymmetry of its buccal surface it is approached by Le Moustier and in the retention of reduced marginal triangular prominences by the Krapina Neanderthals. In size and height also, it agrees with Neanderthal man. In the possession of a very high crown index, however, it differs from all the hominids here listed, but even in this feature some of the European Neanderthals approach it most closely. In this character the Tangier canine is not primitive, but ultra-human and specialized.

The immature left upper first premolar also is more advanced than that of Sinanthropus, and nearer to that of Neanderthal man. In some features this tooth cannot be distinguished from that of *Homo sapiens;* similarly Neanderthal man, in at least some forms, is indistinguishable from recent man in these respects. However, this tooth differs from that of recent man and from the available specimens of Neanderthal man in the retention of a reduced cingulum and of marginal triangular prominences, and in these features it is more primitive.

The Second Individual. In the robustness and height of the roots and in the angle of deviation of the lingual root, taken as a whole, the Tangier molar falls closer to the upper second molar of some Neanderthals than to that of Sinanthropus or of recent man. It differs from Neanderthal molars only in its larger size, though in this respect it is approached more closely by some Neanderthals than by Sinanthropus.

Conclusion. The determination of the relationship of a fossil man is a morphological problem, and can be determined only through anatomical comparisons. The comparison of these specimens, collectively called Tangier man, with other hominids has revealed that Tangier man, in so far as our evidence goes, is distinguished from Sinanthropus and from *Homo sapiens.* Furthermore, this comparison has established the fact that in most of his diagnostic features Tangier man agrees with Neanderthal man and hence should presumably be included in the species *Homo neanderthalensis.* In a few characters, such as the very high crown index of the upper canine, the retention of a reduced cingulum and of triangular prominences in the premolar, and the large size of the molar, he differs from the European Neanderthal specimens as a group. However, in at least one of these differences, some of the individual European Neanderthals fall relatively close to the Tangier specimen. Until further and more complete specimens shall be discovered, the writer has decided to reserve his opinion as to whether these differences indicate a racial diversity within the species *Homo neanderthalensis,* or merely individual variations.

We may conclude with the statement that Tangier man seems to belong to the species *Homo neanderthalensis.*

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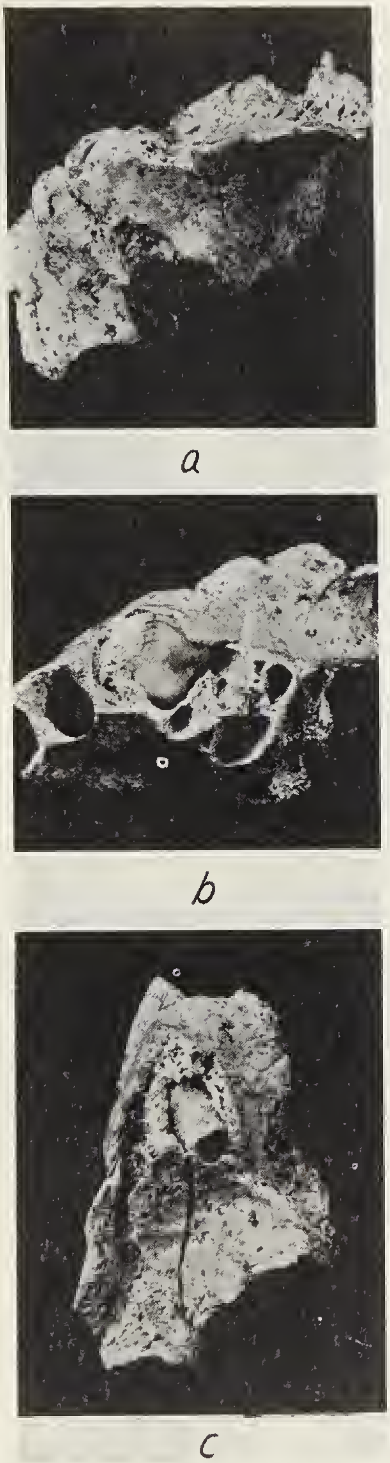

FIG. 1

a. Lateral view of the Tangier maxilla
b. Basal view of the Tangier maxilla
c. Superior view of the Tangier maxilla.
Approximately natural size.

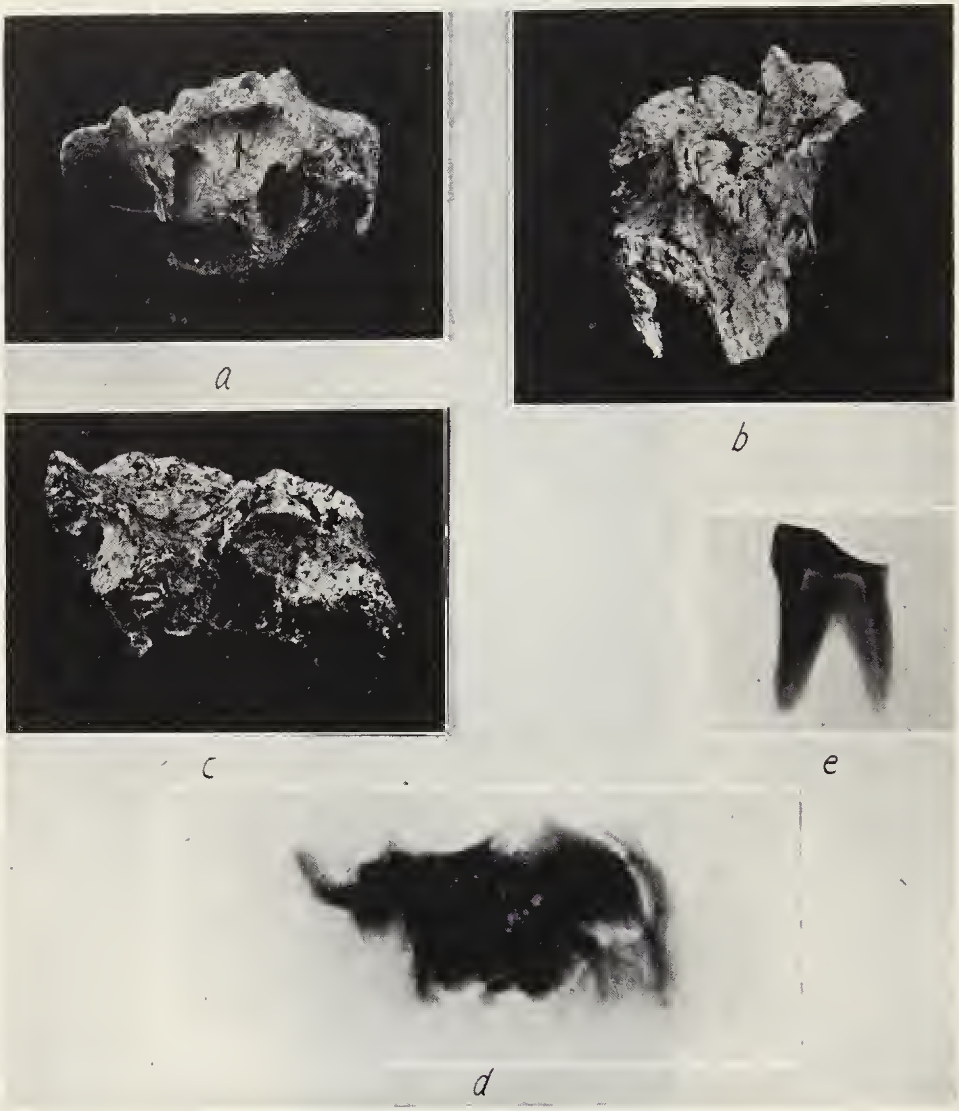

Fig. 2

a. Posterior view of the Tangier maxilla.
Arrow shows the socket of the unerupted second molar.
b. Antero-superior view of the Tangier maxilla.
c. Median view of the Tangier maxilla.
d. Skiagram of the Tangier maxilla.
e. Skiagram of the isolated Tangier molar.
Approximately natural size.

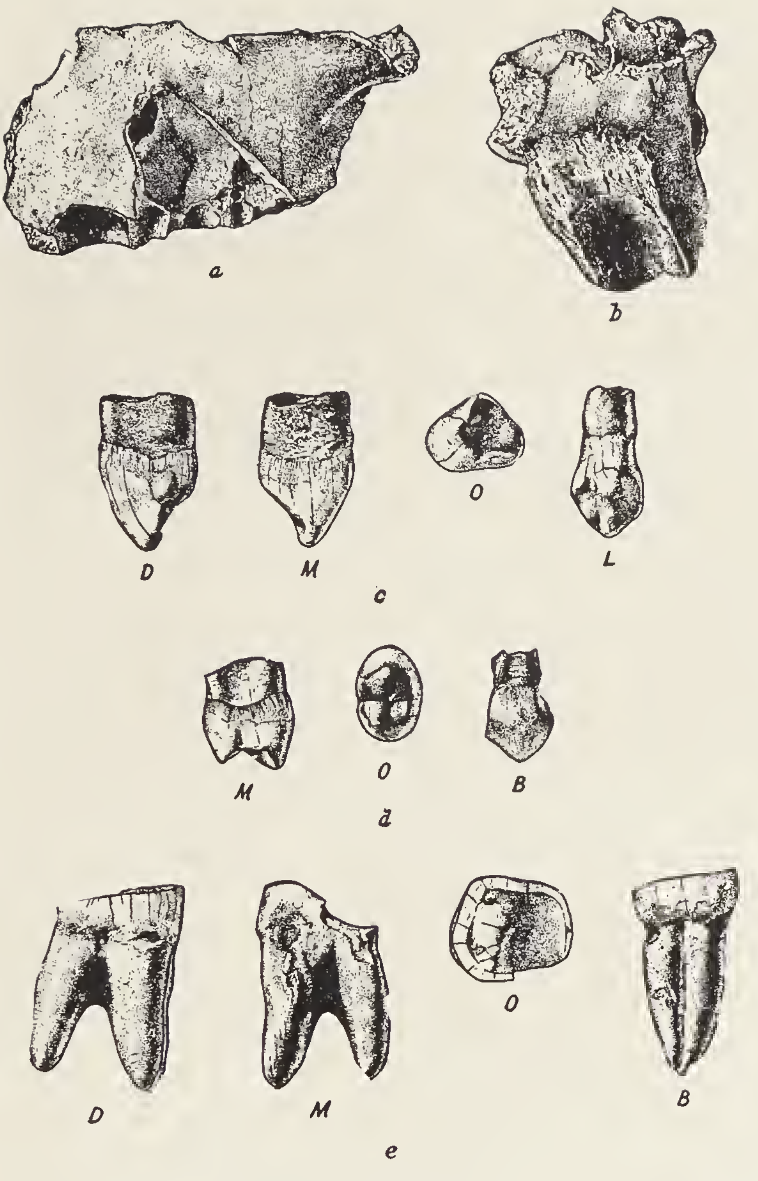

Fig. 3

ABBREVIATIONS

B—Buccal view
D—Distal view
L—Lingual view
M—Mesial view
O—Occlusal view

a. Lateral view of the Tangier maxilla after the extraction of the teeth.
b. Anterior view of the Tangier maxilla after the extraction of the teeth.
c. Left permanent upper canine of Tangier man.
d. Left permanent upper first premolar of Tangier man.
e. Left upper second molar of the Tangier man.
Approximately natural size.

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